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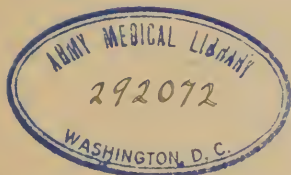
A SYNOPSIS OF LECTURES
DELIVERED AT THE LONG ISLAND COLLEGE HOSPITAL

BY

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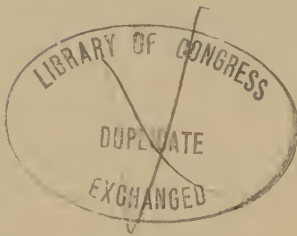
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NOTE.

THIS synopsis is intended to serve as a guide to the student of obstetrics, in following the lecture course, in the use of the text-book, and as well in the hospital practice and the manikin drill. Its chief aim is to aid him in mastering, first, a classified knowledge of the outlines of the subject. This once accomplished his task will be no longer difficult. Upon a well ordered framework of general facts and principles details classify themselves, and a complete and systematic knowledge becomes a matter of comparatively easy growth.

It is believed the practitioner, too, may find these outlines of service as a convenient hand-book for reference.

330 CLINTON AVE., BROOKLYN, N. Y.,

October, 1892.

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OUTLINES OF OBSTETRICS.

THE FEMALE GENITAL ORGANS.

Pudendum : Vulva.—The term pudendum is a collective one for the external sexual organs of the female. It includes the mons veneris, the labia majora and minora, the clitoris and the hymen. Vulva is used in a similar sense, but strictly speaking does not include the mons veneris.

The Mons Veneris.—A fatty cushion overlying the upper half of the symphysis pubis. In addition to fat it contains fibrous and elastic tissue. It is covered with skin, which abounds in sebaceous and sweat glands, and at puberty becomes invested with a growth of hair.

The Labia Majora.—Two prominent, rounded, fleshy folds springing from the mons veneris, as if prolongations of its lateral halves, and extending downward and backward to a point about one and a quarter inch in front of the anal orifice. They are symmetrically placed on either side of the median line and lie in contact with each other in the young nullipara. In older women they shrink and the labia minora protrude between them. They are thickest in front and taper from before backward. The point of contact in front is the anterior and that behind the posterior commissure.

Their covering is skin. The outer surfaces are supplied with hair: the inner resemble mucous membrane, but are sparsely covered with fine hairs. Both surfaces abound in sebaceous glands. Their internal structure is made up chiefly of elastic and adipose tissue and includes a rich venous plexus. The remains of the canal of Nuck may sometimes be traced into them on either side. They are the analogue of the scrotum in the male.

The Labia Minora or Nymphæ.—Two thin folds of mucocutaneous tissue lying obliquely upon the inner surfaces of the labia majora. Anteriorly each subdivides into two subsidiary folds, the superior folds uniting in front of the clitoris to form the prepuce, the inferior folds forming, by their junction below the glans, the frenum of the clitoris. The nymphæ are widest toward their anterior extremities, narrowing gradually from before backward.

The Fourchette or Frenulum Vulvæ.—A transverse fold uniting the labia minora posteriorly.

The Fossa Navicularis.—The boat-shaped surface which appears between the fourchette and the hymen when the labia are separated.

The Rima Pudendi.—The median cleft between the labia of the right and left sides.

The Clitoris.—The analogue of the penis. It lies in the median line just below the anterior vulvar commissure, concealed behind the mucous membrane. It has two corpora cavernosa and a glans, but no corpus spongiosum, and is imperforate. Continuous with the corpora cavernosa of the clitoris are the crura by which it is attached to the ischio-pubic rami. The length of the clitoris during erection is about one inch.

The Vestibule.—The triangular space bounded laterally by the labia minora and below by the margin of the vaginal orifice. Its covering is mucous membrane. At its apex is the glans clitoridis. At the centre of its base, or immediately above it, is the meatus urethræ in the centre of a small tubercle or prominence. The meatus lies three-fourths of an inch below the glans clitoridis, and one inch above the fourchette in the nullipara.

The Muco-cutaneous Line runs along the lateral borders of the vestibule and passes backward around the vaginal orifice just without the base of the hymen.

The Arterial Supply of the pudendum is chiefly from the internal pudic.

The Veins. The labia, clitoris and urethra abound in erectile tissue rich in venous plexuses. The *bulbi vestibuli* are two leech-shaped masses of veins about an inch in length and situated one on either side of the mesial line behind the labia, opposite the vaginal orifice and the base of the vestibule. They lie between the bulbo-cavernosus muscle and the vaginal wall, immediately in

front of the triangular ligament. They communicate freely with the veins of the labia, the vagina, the perineum, the glans clitoridis and with other neighboring venous plexuses.

The Lymphatics of the labia majora, minora and clitoris terminate in the superficial inguinal glands.

The Nerve Supply of the pudendum is derived chiefly from the internal pudic. It is especially abundant in the clitoris and the labia minora.

The Pudendal Glands. Sebaceous glands abound upon the skin surfaces, and especially on the nymphæ. About half a dozen muciparous glands are to be found in the vestibule, grouped about the meatus urethræ.

The Vulvo-vaginal Glands, Glands of Bartholin or Duverney, are two reddish-yellow bodies varying in size from a pea to an almond, lying one on each side of the posterior portion of the vagina, behind the anterior layers of the triangular ligament. They lie partly behind the lower extremities of the bulbi vestibuli. Their ducts, about a half inch in length, run along the inner aspects of the bulbi vestibuli, opening just without the base of the hymen at the sides of the vaginal orifice. Their secretion is poured out freely under sexual excitement and during labor.

The Hymen appears as a septum partially occluding the vaginal orifice when the labia are drawn apart. Ordinarily, in the virgin, it protrudes as a loose fold in the vulvar fissure. According to Budin it is a thinned out prolongation of the vagina itself. Its most common form is that of a crescent, situated at the posterior margin of the vaginal orifice, with its concavity looking forward. It may, however, be annular, or may occupy the entire vaginal orifice, being either imperforate or cribriform—perforated with holes—or may have a single central opening with a fimbriated edge. It is usually torn at the first sexual approaches. An untorn hymen is not, however, an infallible mark of virginity, nor is a torn hymen necessarily evidence that sexual intercourse has been practiced.

The Carunculæ Myrtiformes are, essentially, the remains of the hymen torn in labor by the passage of the child. They appear as minute fleshy tubercles skirting the vaginal orifice or its posterior margin.

The Vagina.—That part of the genital tract between the uterus and the vulva. Its direction is nearly parallel with the pelvic brim.

It is a collapsed tube, its anterior and posterior walls lying in contact.

Relations. Above it is attached to the uterine cervix at about the middle of its length, the lower portion of the cervix projecting into the vagina nearly at a right angle; below it is attached to the ischio-pubic rami. Its posterior wall, at its upper extremity, is in relation with the peritoneum, at its lower with the perineal body; at its middle portion it is loosely connected with the rectum. The upper half of the anterior wall is loosely attached to the bladder; the lower half is intimately connected with the urethra.

The Fornix or roof of the vagina, is that part of the canal immediately about the vaginal portion of the cervix uteri.

Length of anterior wall is about two and a half inches; of the posterior, three and a half inches.

The walls are, however, extremely distensible, and they become permanently relaxed in parous women.

Shape. The vagina, when distended, has a conoidal shape, the orifice corresponding to the smaller end of the cone.

Structure. Three coats: 1. External, a loose layer of connective tissue. 2. Middle, muscular coat, comprising an outer circular and an inner longitudinal layer of unstriped muscular fiber. 3. Internal mucous membrane.

Columnæ Vaginæ. Two median ridges, one on the anterior and one on the posterior wall in the median line, at the lower portion of the vagina.

The *cristæ* are transverse ridges running outward from the *columnæ vaginæ*. They are most marked near the orifice.

The Vaginal Epithelium is of the squamous variety.

The Arterial Supply of the vagina is chiefly from the vaginal, but also from branches of the uterine artery at its upper, and of the pudendal at its lower extremity. These arteries anastomose with the vesical and rectal arteries.

The Veins correspond, but they first form two plexuses surrounding the vagina, one in the external coat, and one immediately beneath the mucous coat. They communicate freely with the hæmorrhoidal, vesical, pudendal, and pampiniform plexuses.

The Lymphatics of the lower fourth of the vagina join with those of the pudendum, terminating in the inguinal glands. Those

from the remaining portion of the vagina unite with the vesical and cervical lymphatics and empty into the hypogastric glands.

The Nerves are from the fourth sacral and the pudic of the spinal system, and from the hypogastric plexus of the sympathetic.

The Mucous Glands are chiefly confined to the lower portion of the vagina.

The Urethra.—Intimately connected with the lower portion of the anterior vaginal wall is the urethra. Though not a genital organ it is of obstetric interest and is therefore described.

Situation. The urethra passes backward below the pubic arch to the bladder, parallel to the plane of the pelvic brim. Its lower three-fourths is inseparable from the anterior vaginal wall.

Size. Length, one and a half inches. Average diameter, one quarter inch. It is largest at the vesical end, smallest at the meatus and is very distensible.

Shape. Straight or slightly sigmoid.

Structure. Two muscular coats and a mucous membrane.

Skene's Glands are two tubular glands about three-fourths of an inch in length, to be found in the muscular wall of the urethra at its lower end, near its floor, one on either side of the median line. Their orifices lie just within the meatus urethræ.

The Uterus.—*Situation.* In the cavity of the pelvis, between the bladder and the rectum, a little nearer the sacrum than the pubes. Its upper border is nearly in the plane of the pelvic brim, its lower border about opposite the tip of the sacrum. The average direction of its long axis is nearly perpendicular to the plane of the pelvic brim. Its position, however, is variable.

Shape. Pyriform—largest end upward—flattened from before backward, convex on its posterior and upper borders, nearly flat on its anterior surface.

Size. (a). Nulliparous uterus, average measurements, nearly one inch thick, one and a half inches wide at the fundus and two and a half inches long.

(b). Parous uterus, approximately one inch thick, two inches wide and three inches long.

Weight. Nulliparous, about one ounce; parous, one-and-a-half ounce.

Regional Divisions. Fundus, body, cervix.

Fundus, that part of the uterus above the Fallopian tubes.

Cervix, approximately the lower half of the uterus in the nulliparous, the lower third in the parous woman.

Body, the part between the fundus and cervix.

Isthmus, the slight constriction at the junction of the cervix and body.

Divisions of the Cervix. (a). *Infravaginal portion*—*portio vaginalis*—that part of the cervix below the vaginal roof.

(b). *Supravaginal Portion.* The part above the vaginal roof—all between the *portio vaginalis* and the *isthmus*.

Uterine Cavity. (a). The cavity of the body is somewhat triangular in shape in the nullipara, its anterior and posterior walls lying in contact. It has three openings, one communicating with the cervical canal and one with each of the Fallopian tubes.

(b). The cavity of the cervix is somewhat flattened from before backward, and is laterally elliptical, thus having an irregular fusiform shape.

The Os Internum is the upper, about one-tenth inch in diameter;

The Os Externum, the lower orifice of the cervical canal, a little larger than the *os internum*.

Structure. I. *The Mucous Membrane.* (a). *Body.* About one twenty-fifth of an inch thick; its epithelium is of the ciliated columnar variety, the cilia propelling toward the fundus. It abounds in tubular glands, which frequently are bifurcated. They are obliquely placed and lined with ciliated epithelium. There is no submucous layer. (b). *Cervix.* Of a reddish yellow color and firmer than that of the body.

Arbor Vitæ. A term applied to two median longitudinal ridges on the cervical mucosa, one anterior and one posterior, each with transverse folds or *rugæ* running obliquely outward and upward.

Nabothian Glands. In and between the *rugæ* of the *arbor vitæ* are mucous follicular glands known as the Nabothian glands. The secretion of the cervical glands has an alkaline reaction.

The Epithelium of the cervical canal is of the ciliated columnar variety almost to the *os externum* in the adult. The epithelium of the external surface of the *portio vaginalis* is squamous like that of the vagina.

II. *The Musculature* of the body constitutes the greater part of the thickness of the uterine wall. Its fiber is of the unstriped variety.

Layers. (a). Outer, very thin, continuous with the muscular layers of the Fallopian tubes, the ovarian, round, broad and utero-sacral ligaments.

(b). Middle, comprising the bulk of the uterine muscle, a mesh-work of longitudinal and transverse bundles.

(c). Inner, circular layer, extremely thin, surrounding the orifices of the Fallopian tubes and the os internum and externum.

The cervix consists mainly of connective tissue.

III. *The Peritoneal Coat.* The peritoneum covers about two-thirds the length of the uterus in front and posteriorly extends down beyond the uterus over about one inch of the vagina.

Nulliparous and Parous Uterus.—In the *nulliparous uterus* the corporeal cavity is triangular, fundus nearly flat, cervix conical, and the os externum a mere dimple.

In the *parous uterus* the cavity is oval, the fundus dome shaped, the cervix cylindrical, and the os externum a transverse slit, with the lips more or less fissured.

Ligaments of the Uterus.—(a). *Broad Ligaments.* The pelvic peritoneum dips down posteriorly into the lesser pelvis, is reflected over one inch or more of the upper end of the posterior vaginal wall and over the posterior surface of the uterus, passes over the uterus, investing its anterior surface to the isthmus, and is again reflected upward and over the bladder. The uterus thus lies between the layers of a transverse fold of peritoneum. The lateral portions of these transverse folds, stretching from the uterus to the sides of the pelvis, form the broad ligaments. The ovarian ligament, the Fallopian tube and the round ligament are enveloped in subsidiary folds of the broad ligament.

The Infundibulo-pelvic Ligament is that part of the superior border of the broad ligament on each side, extending from the Fallopian tube to the pelvic wall.

(b). *Utero-sacral Folds.* Two semilunar folds of peritoneum, enclosing unstriped muscular fiber and connective tissue, which pass one on each side of the rectum from the lower portion of the sides of the uterus to the second bone of the sacrum. In the nulliparous woman they spring from the uterus at the level of the os internum; in the parous, from points somewhat above the os internum. These folds are also known as the folds of Douglas, and the space between them as Douglas' pouch, or *cul-de-sac*.

(c). *Utero-vesical Folds*. Two folds of peritoneum extending from the uterus to the bladder and forming the lateral borders of the utero vesical space. They contain a few muscular fibers.

(d). *Round Ligaments*. The cord-like ligaments which pass from the angles of the uterus forward through the inguinal canals, to blend with the structures at and immediately below the external ring. Length, four to five inches. They contain striped and unstriped muscular fibers.

The Arteries of the uterus are the hypogastric and ovarian. They pass to the uterus between the folds of the broad ligament on either side. The hypogastric artery approaches the uterus just above the vaginal junction, the ovarian at the level of the cornua. A branch of the ovarian artery descends along the lateral border of the uterus to communicate with the hypogastric. Another branch supplies the fundus and anastomoses with its fellow of the opposite side. The circular artery surrounds the cervix at the isthmus, uniting the arteries of the opposite sides of the uterus with each other. The arteries of the uterus are remarkable for their free anastomosis and tortuous course. Arterial tufts are given off to the lateral borders of the uterus, whose branches form spirals within the uterine wall. They end in a meshwork of capillaries about the utricular glands.

The Veins. The uterine plexus of veins lies immediately beneath the peritoneal coat of the uterus and extends between the folds of the broad ligament. It communicates with large sinuses in the middle muscular coat which are encircled by muscular bundles. Its outlet is the hypogastric vein and the pampiniform plexus.

The Lymphatics. Very numerous in the body of the uterus and communicating with the lymph spaces of the mucous membrane and the muscular coat. They form an intricate network over the surface of the uterus under the peritoneum, also over the Fallopian tubes. They are fully developed only during pregnancy. The lymphatics of the fundus follow the course of the Fallopian tubes to the ovary, thence to the lumbar glands. Those of the body pass outward in the broad ligament to the iliac glands. The cervical lymphatics unite with those from the upper part of the vagina and empty into the hypogastric glands alongside the rectum.

The Nerves. Chiefly from the sympathetic, from the inferior hypogastric and spermatic plexuses. The cervix also receives filaments from the first, second and third sacral nerves. The uterine nerves terminate in part in the nuclei of the muscle cells.

The Fallopian Tubes: Oviducts.—Two narrow tubes, one running outward from each horn of the uterus and communicating with the uterine cavity. The outer portion of the tube takes a tortuous course, partially surrounding the ovary. Length, three to five inches.

Divisions. (a). *The Isthmus* is the portion of the tube next the uterus. It is an inch or more in length and one-eighth of an inch in diameter.

(b). *The Ampulla* is the dilated portion of the tube next beyond the isthmus about one-third of an inch in diameter.

(c). *The Fimbriated Extremity, Pavilion or Infundibulum*, is the free trumpet-shaped end of the tube, the margin of which is fringed with a number of irregular processes called fimbriæ. Here the tube expands to about three-fourths of an inch in diameter.

The Fimbria Ovarica is the special fimbria, a little larger than the others, which is attached to the ovary.

The Ostium Uterinum barely admits a bristle— $\frac{1}{2}\frac{1}{5}$ inch in diameter.

The Ostium Abdominale is of the size of a small goose-quill.

Structure. Three Layers. 1. *Outer or Peritoneal Coat*, which invests two-thirds the circumference of the tube. A subperitoneal layer of connective tissue contains a rich plexus of blood vessels.

2. *Middle or Muscular Coat*, composed of an inner circular and two outer longitudinal-layers of unstripped muscular fiber.

3. *Inner or Mucous Coat*, lined with ciliated columnar epithelium and very vascular. Except in the intramural portion of the tube, the mucous membrane is disposed in longitudinal folds, which become extremely complex in the ampulla. It has no glands. The motion of the cilia propels toward the uterus.

The Arteries of the Fallopian tube are branches of the ovarian.

The Veins open into the pampiniform or ovarian plexus lying between the folds of the broad ligament below the tube.

The Lymphatics unite with those from the fundus of the uterus and front of the ovary and terminate in the lumbar glands.

The Nerves are derived from the inferior hypogastric plexus on each side.

The Ovaries.—Two in number, one on each side of the uterus. They correspond to the testes of the male.

Situation. One on the posterior fold of each broad ligament an inch or more below the level of the ilio-pectineal line and the same distance from the uterus, yet they have great mobility within normal limits. Each ovary projects through the posterior fold of the broad ligament, and is connected with the corresponding horn of the uterus by the ovarian ligament.

Shape. A flattened ovoid. Its free border is convex. The anterior edge is nearly straight. This straight border is the hilum. The ovary is thinner at the hilum, thicker at the convex border. Its superior surface is nearly flat; the inferior, convex. The inner end is narrower, pointed, and merges into the ovarian ligament; the outer is more obtuse and bulbous. The shape, however, is variable.

Size. About one and a half inches in length by three-fourths in width and one-half in thickness, yet variable. Average normal weight in the nullipara, eighty-five grains. The size increases during menstruation, also in early pregnancy.

Structure. (A). External. In early life the external surface is smooth, like an almond. Later in life, after puberty, it becomes uneven, acquiring a wrinkled appearance, owing to the cicatrices from rupture of Graafian follicles. In very old age it again becomes smooth.

Its epithelium is that of a mucous membrane, columnar and non-ciliated. The peritoneum terminates abruptly at the ovary.

(B). *Internal. (a). The Stroma*, containing some unstriated muscular fiber, in addition to connective tissue.

(b). *The Tunica Albuginea*, a dense layer of stroma immediately underlying the germinal epithelium of the ovarian surface.

(c). *The Zona Parenchymatosa*, or cortical portion of the ovary, grayish in color.

(d). *The Medullary Zone, or Zona Vasculosa*, the portion about the hilum, reddish in color. Here enter the blood vessels, nerves and lymphatics.

The Ovarian Ligament is a muscular cord one-fifth inch in diameter, which extends from the inner end of the ovary to the horn of the uterus, joining it immediately behind and below the attachment of the Fallopian tube. Its length is about an inch.

The Arterial Supply of the ovary is derived from branches of the ovarian arteries which enter at the hilum.

The Veins emerge from the hilum and empty into the bulb of the ovary, which communicates with the pampiniform plexus.

The Lymphatics, together with those of the tube and fundus uteri, empty into the lumbar glands.

The Nerves are derived from the inferior hypogastric plexus.

The Graafian Follicles.—Most numerous in the cortical layer. They are developed from the germ epithelium of the ovarian surface. Each follicle contains generally but one ovule. At any time during the child-bearing period, ten or twenty Graafian follicles may be found considerably developed near the surface of the ovary. Number of rudimentary Graafian follicles at birth, 40,000 or more in each ovary.

Size, $\frac{1}{100}$ to $\frac{1}{16}$ inch in diameter.

Structure of a Graafian Follicle. Constituent parts:—

1. Tunica Fibrosa.
2. Tunica Propria.
3. Tunica (Membrana) Granulosa, a multiple layer of cylindrical epithelium. The *Discus Proligerus*, or *Germinal Eminence*, is a heaped-up mass of cells of the membrana granulosa at one side, containing the ovule.
4. Liquor Folliculi, a clear albuminous fluid, para-albumen.

MALFORMATIONS OF THE UTERUS.

Uterus Unicornis.—One lateral half absent; has generally but one Fallopian tube.

Uterus Duplex.—A bifid uterus; each lateral half forms a distinct organ.

Uterus Bicornis.—The lateral halves are distinct above, united below—the upper part of the uterus is bifid.

Uterus Cordiformis.—The fundus presents an antero-posterior median sulcus.

Uterus Septus Bilocularis.—The uterine cavity is divided into two lateral cavities by a median partition.

PHYSIOLOGY OF PREGNANCY.

OVULATION. MENSTRUATION. CONCEPTION.

Ovulation.—The process by which the ovule is matured and discharged from the ovary. It occurs, in the rule, once in twenty-eight days, during the period of functional activity of the ovary; is attended generally in the human subject with a bloody discharge from the uterus—menstruation. Yet ovulation may occur without menstruation, and menstruation without ovulation. Usually but a single follicle ruptures at each epoch, sometimes two or more.

Menstruation.—A periodic congestion of the female genital organs attended with a bloody discharge from the uterus—the menses—and with certain changes in its mucous membrane.

The Constituents of the menses are blood, shreds of endometrium, uterine and vaginal secretions.

Amount, four to six ounces.

Average duration of the flow, three or four days.

The interval between the menstrual epochs is usually twenty eight days.

Puberty is synonymous with sexual maturity and is marked in the female by the first onset of ovulation and menstruation.

Age of Puberty. The usual age of puberty is the fifteenth year. It varies with race, climate and other influences, occurring in exceptional cases as early as the tenth or as late as the twentieth year of age.

The Menopause, or the final cessation of menstruation and of the capacity for child-bearing, occurs in most women at about the age of forty-six years. Occasional variations of ten years or more on either side of this limit are possible.

Phenomena Attending the Rupture of a Graafian Follicle.

An increase of fluid contents takes place from increased vascularity. Loops of blood vessels are projected into the cavity of the follicle. Contiguous portions of the ovary and, to a certain extent, its whole structure, exhibit a similar increase in vascularity. The follicle now appears as a bright red spot on the surface of the ovary.

Absorption of overlying ovarian structure takes place, owing to increasing pressure of the liquor folliculi. The follicle finally rup-

tures and discharges its contents, an effusion of blood taking place into the follicle after rupture. Apparently the ovule is floated into the pavilion of the tube by a stream of serum propelled by the cilia of the fimbria ovarica. It is propelled through the Fallopian tube partly by ciliary motion, and in the narrower portion of the tube partly by muscular action.

The Ovule.—Primarily a nucleated cell developed from the germ epithelium covering the surface of the ovary. Diameter, $\frac{1}{120}$ inch at full maturity.

Parts. 1. *Vitelline Membrane.*

2. *Zona Pellucida.*

3. *Vitellus, or Yolk.* A mass of oleo-albuminous matter containing shining granules.

4. *Germinal Vesicle.* The nucleus of the cell. $\frac{1}{400}$ inch in diameter, situated toward one side of the yolk near its surface.

5. *Germinal Spot.* The nucleolus of the cell. A dark, granular spot, about $\frac{1}{3000}$ inch in diameter, within the vesicle.

Female Pronucleus. The germinal vesicle moves toward the circumference of the ovule and becomes the *female pronucleus*.

The Corpus Luteum. The body formed in the ovary by the retrograde metamorphosis of the Graafian follicle after rupture.

The Corpus Luteum of Menstruation attains its full development in two to four weeks, and becomes reduced to a mere cicatrix by the end of about two months.

The Corpus Luteum of Pregnancy grows six or seven weeks, then remains stationary to the end of the fourth month; subsequently retrogrades slowly until delivery; becomes an insignificant cicatrix by the end of a month after delivery.

CONCEPTION: IMPREGNATION.

Impregnation is the fructification of the ovule by union with the fecundating elements of the male, the spermatozooids.

Insemination is the act of depositing the seminal fluid in the female genital tract.

The Seminal Fluid is a glutinous, alkaline, albuminous fluid, heavier than water, the combined product of the testicles, the

prostate, and Cowper's glands. From one to three drachms is ejaculated during the orgasm.

Chemical constituents, water, proteids, phosphates, fats.

Microscopical elements, spermatozooids, phosphatic crystals.

The Spermatozooids are microscopic bodies resembling tadpoles in shape. Each consists of a flattened ovoid head (cell nucleus) and a long thread-like tail. The filiform tails maintain a constant lashing motion, due to amœboid movements of protoplasm, as long as the spermatozooids retain their fecundating power.

Length, $\frac{1}{600}$ to $\frac{1}{400}$ inch.

Vitality of Spermatozooids. Under favorable conditions, within the genital passages of the female, the spermatozooids as well as the ovule retain their vitality for an unknown period of time. They have been known to live in the human species under favorable circumstances for eight days. They may undoubtedly retain their fecundating power for a much longer time.

They are destructible by extreme heat or cold. The seminal elements of man retain their power of motion, however, between the temperatures of 5° and 116° F. They are destroyed by acids, by numerous other chemical poisons and by desiccation.

The Migration of Spermatozooids. Normally the male fluid is ejaculated upon and about the cervix. Yet the spermatozooids may traverse the entire length of the genital tract and impregnation is possible without introception of the male organ. Locomotion is accomplished by the vibratile motion of the tail. Rate of locomotion about one inch in seven and a half minutes.

Impregnation Occurs: Where? In the Fallopian tube or possibly in the uterus.

When? In the great majority of cases within a week after the cessation of a menstrual period.

How? A spermatozoid penetrates the zona pellucida of the ovule, mingles with the egg protoplasm and forms the *male pronucleus*. A single ovule is fecundated by a single spermatozoid. The male and female pronuclei unite to form the *vitelline nucleus* of the fecundated egg.

DEVELOPMENT OF THE OVUM OR IMPREGNATED OVULE.

The egg on leaving the ovary consists of the parts above described and has a diameter of $\frac{1}{120}$ inch. Cells of the membrana granulosa

partially envelop it on its escape from the ovary. It receives an albuminous envelope in the course of its passage through the oviduct. This envelope supplies the first nutriment for the development of the egg.

Segmentation of the vitellus, or yolk, begins in the vitelline nucleus and continues until the whole yolk becomes a granulated mass. Segmentation in the human subject probably does not occupy more than six or eight days. The ovum now has a diameter of $\frac{1}{80}$ to $\frac{1}{50}$ inch, and has usually reached the cavity of the uterus.

The Blastoderm. Each granule forms a separate cell. The cells unite to form a continuous membrane which lines the zona pellucida. This is the blastodermic membrane from which all the embryonic structures are subsequently formed. Cleavage takes place through the vitelline nucleus, its ultimate segments forming the nuclei of the cells of the blastoderm.

Blastodermic Layers. The blastoderm forms in two layers, the external and internal layers (*epiblast* and *hypoblast*, or *ectoderm* and *entoderm*). A third layer (the *mesoblast* or *mesoderm*) is subsequently developed.

From the external blastodermic layer are formed the epidermis, the cerebro-spinal axis, and the organs of special sense.

From the middle layer are developed bone, muscle, connective tissue, the heart and blood vessels and the genito-urinary organs.

From the internal blastodermic layer the epithelium of the alimentary and respiratory tracts and glands are formed.

The Blastodermic Vesicle. By the accumulation of fluid in the ovum it becomes converted into a vesicle called the blastodermic vesicle.

The Area Germinativa or Embryonic Spot. The blastoderm soon presents an opaque, oval spot upon its surface, consisting of an aggregation of cleavage cells on the inner surface of the membrane. This is the area germinativa.

The Area Pellucida is a clear oval space, which appears a little later in the area germinativa, with an opaque border.

The Primitive Trace is a shallow groove or sulcus which now develops lengthwise through the center of the area pellucida. This is the first indication of embryonic structure and marks the place of the cerebro-spinal canal.

The Dorsal Laminae are two longitudinal folds, which spring up on either side of the primitive trace. By the end of the first month they arch over and unite to form the cerebro-spinal canal.

The Ventral Laminae develop and unite in similar manner to form the cavity of the trunk.

The Umbilical Vesicle. The cephalic and caudal extremities of the embryo are formed by folds which spring up at either end of the primitive trace. The inner layer of the blastodermic vesicle becomes divided into two parts, the embryonic portion and the umbilical vesicle. The embryonic portion constantly increases in size, the umbilical vesicle diminishes till at the end of the sixth week it is no larger than a pea, and finally disappears. The umbilical vesicle contributes to the nutrition of the embryo before the development of the chorial villi.

DEVELOPMENT OF THE EMBRYO AND FŒTUS.

End of First Month.—Ovum the size of a pigeon's egg ; diameter three-fourths of an inch ; length of embryo one-third of an inch.

First rudiments of fœtal structure discernible.

Heart, kidneys, liver, extremities and the eyes, oral and anal orifices begin to be formed. Heart begins to beat, third week.

Spinal canal closed.

Second Month.—Ovum the size of a hen's egg ; two and a half inches in diameter ; length of embryo, one and a quarter inches : average weight one drachm.

Rudimentary vertebræ are present.

Frontal unites with the superior maxillary processes.

Centers of ossification apparent in inferior maxillary bones and clavicle.

Visceral arches nearly closed.

Eyes, nose and ears begin to be developed.

Rudiments of hands and feet appear, webbed.

Umbilical cord an inch or more in length.

Sexual organs apparent.

Third Month.—Ovum size of a goose's egg ; diameter four inches. Embryo about three and a quarter inches in length ; weight, one ounce.

Product of conception now, for the first time, occupies the whole cavity of the uterus.

Placenta distinctly formed ; chorionic villi atrophied over two-thirds the surface of the ovum.

Umbilical cord begins to be twisted.

External parts of the embryo well formed.

Ossific centers appear in most of the bones.

Rudimentary finger and toe-nails appear.

The cavities are completely closed.

Sex differentiated by the presence or absence of a uterus.

Active movements begin during the latter part of this month.

Fourth Month.—Length of foetus, five inches ; average weight, about three ounces.

Ossification well established in frontal and occipital bones.

Sex clearly defined.

Lanugo present.

Placenta complete.

Fifth Month.—Length of foetus, nine inches ; average weight, nine and a half ounces.

Cord about one foot in length.

Eyelids begin to open.

Ossification begins in the ischium.

Hair and nails begin to develop.

First appearance of vernix caseosa.

Heart sounds audible.

Sixth Month.—Length of foetus, twelve inches ; weight, about twenty-three ounces.

Ossification begins in the pubic bones.

Seventh Month.—Length of foetus, fourteen inches ; average weight, two and a half pounds.

Pupillary membrane begins to disappear.

In boys, testes in the scrotum—at least the left one.

Ossification begins in the astragalus.

Foetus viable, but viability feeble.

Eighth Month.—Length of foetus, sixteen inches ; average weight, three and a half pounds.

Nails completely developed, but not projecting beyond finger tips.

Ossification begins in lower epiphysis of the femur.

A child born at this period is viable.

Lanugo begins to disappear from the face.

Ninth Month.—Length of foetus, seventeen inches; diameters of the head, a half to two-thirds of an inch less than at term; average weight, about four pounds.

Lanugo begins to disappear from the body.

Tenth Month.—At term average length of foetus is from eighteen to twenty inches; average weight, boys seven and a quarter pounds; girls, seven pounds.

Signs of Maturity:—

Measurements:

Length, eighteen to twenty inches;

Sub-occipito bregmatic circumference, thirteen inches;

Length of foot, three and one-eighth inches.

Weight: seven to seven and one-fourth pounds.

Eyes usually open.

Face and body plump.

Suckles.

Cries lustily.

Lanugo has almost entirely disappeared from the body.

Vernix caseosa present chiefly on the back and on the flexor surfaces of the limbs.

Finger nails project beyond the finger tips, toe nails to end of the bed of the nail.

Cartilages of the ear and the nose firm.

Cranial bones hard, sutures and fontanelles small.

Centers of ossification well developed in the lower epiphysis of the femur and the astragalus, beginning in the upper epiphysis of the tibia and the cuboid bone.

FCETAL CIRCULATION.

The peculiarity of the foetal circulation is due mainly to the fact that pulmonary respiration is in abeyance during intrauterine life, the respiratory blood changes being effected in the placenta. Only enough blood goes to the lungs for their nutrition.

The blood passes from the placenta through the umbilical vein. A part goes direct to the ascending cava by the ductus venosus, and a part reaches it through the liver and hepatic vein. With the

blood from the lower extremities it then passes to the right auricle, and is deflected by the eustachian valve through the foramen ovale into the left auricle, thence into the left ventricle and into the aorta. The larger part goes to the upper extremities and the head. Thence it returns by the descending cava to the right auricle, passes to the right ventricle, a very small part going to the lungs by the pulmonary artery, the main portion entering the aorta through the ductus arteriosus; a small part of this mixed blood goes to the lower extremities, the greater part returning to the placenta by the hypogastric arteries.

DEVELOPMENT OF MEMBRANES AND PLACENTA.

Membranes.—Two Maternal and two Fœtal. They become ultimately fused into one, which, with the placenta, lines the cavity of the uterus. In the sac thus formed is contained the fœtus surrounded by the liquor amnii.

Maternal Membranes.—(a). *The Decidua Vera* is developed from the mucosa of the uterus, and is the outermost of the envelopes of the fœtus. It increases in thickness ten fold in the first month—*i. e.*, to two-fifths of an inch.

The decidua vera ends at the os internum. It has the shape of the cavity of the uterus and has three apertures, one corresponding to the internal os and one to the opening of each Fallopian tube.

Decidua Serotina or Placental Decidua. That part of the decidua vera that underlies the ovum, where the placenta is subsequently developed.

(b). *Decidua Circumflexa or Reflexa or Epichorial Decidua.* When the ovum becomes embedded in the folds of the uterine mucosa, that structure grows up around it. This reflected envelope is the decidua reflexa or circumflexa. It grows with the ovum and comes in contact with the decidua vera by the end of the third month, blending with it. The entire cavity of the uterus is from this time occupied by the ovum and its membranes. Except at the placenta the deciduæ undergo atrophy and are reduced to a single thin membrane by the end of the third month; the decidua reflexa wholly disappears by the end of the seventh.

Fœtal Membranes: (A). **Amnion.**—The innermost of the fœtal envelopes.

Development. As soon as the embryo begins to take shape, by the end of the third week, a second fold of the external blastodermic ridge springs up entirely around the edges of the embryo. This membranous ridge develops till its edges meet over the back of the embryo. The surfaces brought in contact fuse together. The neck of the pouch thus formed is subsequently absorbed. The pouch itself is the amnion. It has neither vessels nor lymphatics.

The outer blastodermic layer recedes toward the zona pellucida.

Structure. A layer of connective tissue and one of endothelial cells.

Function. To secrete and hold the liquor amnii.

The Liquor Amnii is the clear alkaline fluid which occupies the cavity of the amnion.

(a). *Source.* Partly maternal, partly foetal.

Composition. Water, a trace of albumen, saline matter, urea, epithelium.

(b). *Specific Gravity*, 1007.

(c). *Amount.* Between one and two pints at term.

(d). *Uses.* During gestation, protection of the foetus and uterus; permits active foetal movements.

During parturition, protection of foetus and uterus; helps dilate the cervix.

(B). **Chorion.**—The outermost of the envelopes of foetal origin.

Formation. It is formed by fusion of the allantois with the subzonal membrane of the ovum. Between the chorion and the amnion is a layer of gelatinous material, in which the umbilical vesicle lies enveloped.

Union of the Foetal Envelopes. The amniotic sac expands till it comes in contact with the chorion and unites with it at the end of the second month.

The envelope of the ovum finally becomes practically a single membrane, the product of the union of the maternal and foetal membranes. Usually, however, the chorion may be stripped off from the amnion at birth.

Chorial Villi. Soon after the fixation of the egg, its surface becomes everywhere covered with transparent villi. They are at first single, but with the growth of the ovum they elongate and become compound. The outer surface of the globular ovum thus becomes everywhere "shaggy."

The Allantois is a diverticulum pushed out from the posterior portion of the entoderm or intestinal canal at about the time when the amniotic folds are developed.

The allantois is projected to the external envelope of the ovum, between the amnion and the outer blastodermic fold, and it expands till by the end of the third week it completely envelops the embryo and its investing amnion, and lines the external envelope of the ovum as a flattened sac.

Its office is to project vessels from the embryo to that portion of the outer envelope where the placenta is to be developed, the chorion frondosum.

The pedicle of the allantois ultimately dwindles to a mere cord known as the umbilical communication, the rudimentary umbilical cord.

Blood Vessels. The villi at first are not vascular, but they soon receive vessels from the allantois. The capillaries of the chorial villi enter the stem of the villus, follow the subdivisions, go to the end of each rootlet, turn, forming loops, and go back to empty into the venous trunks of the chorion. The chorial villi are very similar to those of the intestines in structure and in function.

Chorion Læve. Toward the end of the second month the chorion begins to become bald everywhere except over the portion about the insertion of the foetal blood vessels. Over two-thirds the surface of the chorion the villosities gradually atrophy, until by the end of the second month this part of the chorion becomes smooth, the *chorion læve*.

Chorion Frondosum: Over the remaining third of the chorial surface the villosities develop more rapidly than before till this portion presents a thick, spongy mass of villosities, the *chorion frondosum*. They enter into the formation of the placenta. The development of the vessels keeps pace with the growth of the villosities in the placental portion of the chorion; elsewhere the capillaries shrink with their villi.

After the formation of the placenta the non-placental portion of the chorion serves only for protection.

The Placenta when fully formed is a spongy mass of lenticular shape, having a diameter of seven to nine inches, maximum thickness of nearly an inch, and a weight of one pound.

The Foetal Surface is a smooth surface of amniotic membrane. The umbilical cord is attached generally at its center.

The Maternal Surface is rough and divided into irregular lobes or cotyledons from one-half to one and a half inch in diameter, sixteen to twenty in number. These lobes are separated by membranous partitions which penetrate the substance of the placenta at their borders, as far as the foetal surface. The maternal surface is covered with the outer layer of the decidua scrotina. The placenta after separation is studded with small openings, mouths of the veins and of the curling arteries of Hunter.

Seat. In the upper segment of the uterus, on the anterior or posterior wall with about equal frequency; rarely the insertion is lateral.

Structure. Consists essentially of blood vessels. The vascular foetal tufts, sixteen to twenty in number, are suspended in lakes of maternal blood. The lakes are supplied by the curling arteries of the uterus. The maternal blood returns from the spaces between the foetal tufts, by the coronary vein upon the margin of the placenta and by sinuses situated in the septa between the cotyledons. The foetal and maternal circulations do not communicate directly.

Development. Begins in the second month of gestation. The limits of the placenta are distinctly defined at the end of the third; its characteristic form and structure are complete at about the end of the fourth month.

The chorionic villi penetrate the inter-glandular portion of the mucosa, and ramify to form dendritic tufts. The walls of the crypts into which the villi and their branches dip are lined with epithelium and are very vascular. The capillaries around the crypts enlarge and inosculate till every loop of the foetal villi is enveloped by a mesh-work of dilated maternal capillaries. The maternal capillaries enlarge, obliterate the inter-spaces, and coalesce into great lakes of blood. These lakes communicate freely with the uterine sinuses.

The placenta, then, is made up of four elements: Maternal—uterine crypts, blood vessels around the crypts; Foetal—chorionic tufts, vessels of the tufts.

Function. The placenta is at once the nutritive, respiratory and excretory organ of the foetus. The interchange between the foetal and maternal blood takes place by osmose.

The layer of epithelium which clothes the foetal villi possibly has some other function than mere osmosis—a secretory action.

Umbilical Cord.—The pedicle which connects the fœtus with the placenta.

Fœtal insertion of the cord, at the umbilicus.

Placental insertion, generally central, sometimes lateral, marginal or velamentous, *i. e.*, one in which the vessels separate in the membranes before reaching the placenta.

Length, average, about twenty inches ; varies from seven or less to sixty inches.

Size, about that of the little finger of the adult.

Tensile strength, five to twelve pounds.

Structure. At about the end of the first month it becomes invested with a process of the amnion which is continuous with the fœtal epidermis. It contains the umbilical vessels imbedded in a jelly-like connective tissue, the gelatine of Wharton.

Vessels. It has, primarily, two arteries and two veins; subsequently the veins fuse into one. Exceptionally there is but one artery. The walls of the arteries are only a little thicker than those of the veins. The cord is usually twisted, the vein being wound around the arteries. The existence of nerves and lymphatics in the cord has not been proven.

TIME OF CLOSURE OF THE FŒTAL APERTURES.

Umbilical arteries, two days after birth.

Umbilical vein and ductus venosus, generally six to seven days.

Ductus arteriosus, within nine to fifteen days.

EFFECTS OF PREGNANCY ON THE MATERNAL ORGANISM.

Changes in the Uterus.—The first effects of pregnancy are noted in the uterus. It changes in size, shape and structure.

Size. Growth begins immediately with the fixation of the ovum, and is continuous with its growth. Its development during the first two months is chiefly in the lateral and antero-posterior directions. The uterine enlargement is partially a dilatation in the latter months. The thickness of the uterine walls at term is between one-sixth and one-quarter inch.

The internal surface is increased from 5 or 6 to 350 square inches.

The capacity from 1 to 400 cu. inches—519 times.

The weight from one or one and a half ounces for the prægravid state, to two or two and a half pounds at term.

APPROXIMATE MEASUREMENTS OF THE GRAVID UTERUS.

Stage of Gestation.	Total Length.	Width.
12 weeks.	5 inches.	4 inches.
16 “	6 “	5 “
20 “	7 “	6 “
24 “	8½ “	6½ “
28 “	10 “	7 “
32 “	11½ “	8 “
36 “	13 “	9 “
40 “	14 “	10 “

Shape. First, trimester, pyriform; second, the corpus uteri is a flattened spheroid; last, it is generally ovoid, with the smaller end down.

Structure. The muscular fiber grows seven to eleven times in length, and two to five in thickness. There is possibly, also, some hyperplasia of muscular tissue. At the os internum there is a preponderance of circular fibers in all the layers.

The Arteries increase in length and caliber.

The Uterine Plexus of Veins becomes developed into a system of enormous sinuses in the middle coat of the muscularis, and in the inner coat beneath the placental attachment.

The Lymph Tubes become hypertrophied to the size of a goose quill, and the lymph spaces enlarged.

Nerves. Hypertrophy of the nervous structures probably keeps pace with the general development of the uterus.

Changes in the Cervix Uteri.—*Size.* The apparent shortening of the cervix during gestation is due partly to softening, and partly to swelling of the vaginal mucous membrane and loose cellular tissue around the cervix at the vaginal junction. The cervical enlargement is due in part to hypertrophy, but mainly to loosening of its structure from serous infiltration, and is complete at about the eighth month.

Structure. Softening is progressive from below upward, and involves the entire cervix by the end of the eighth month.

Shape. The cervical canal dilates during gestation from below upward. At the end of the eighth month, in multiparæ, the head of the child may generally be touched with the finger through the cervix.

Changes in other Pelvic Structures.—*The Peritoneal Covering* of the uterus is developed by tissue growth, *pari passu* with the development of the uterus.

The Broad Ligaments accommodate themselves to the growth of the uterus partly by the unfolding of their layers and partly by hypertrophy and hyperplasia of tissue elements.

The Ovaries and Fallopian Tubes lie in contact with the uterus by the time it rises out of the pelvis.

The Vagina becomes hypertrophied during pregnancy. It increases in size, and in the length of its walls and in vascularity.

General Changes.—*The Heart.* According to most authorities, hypertrophy of the left ventricle of the heart during gestation is physiological and is designed to meet the increased resistance in the systemic circulation introduced by the new vascular arrangements of the uterus and placenta. The cardiac movements are slightly accelerated.

The Thyroid Gland becomes hypertrophied during pregnancy, and a certain degree of enlargement remains permanent.

The Spleen is also enlarged.

The Blood. The total volume is increased in the latter half of pregnancy.

The proportion of water is little, if at all, increased.

There is more fibrin;

More effete matter (from circulation of the fœtus);

Less albumen.

The Nervous System. There is a marked increase in the irritability of the nervous system and psychical changes are common.

Body Weight. There is usually a considerable gain in the weight of the body during the latter months (about seven and a half per cent.), due mainly to increased deposit of fat.

SIGNS OF PREGNANCY.

HISTORY: ANAMNESIS.

I. Suppression of Menses. From date of conception.

Affords strong presumptive evidence of pregnancy in the absence of other appreciable cause in a woman of previously regular menstrual habit.

Exclude :

Anæmia ;
Tuberculosis ;
Syphilis ;
Chronic nephritis ;
Exposure to cold ;
Change of climate ;
Tardy menstruation ;
Menopause ;
Emotional causes.

Pseudo-menstruation during pregnancy. Periodical hemorrhages may occur in the first months of gestation from lesions of the portio vaginalis or cervical endometrium, from polypus of the cervix, chronic decidual endometritis or placenta prævia. Distinguish from the catamenia by the amount and duration of the flow.

Pregnancy in non-menstruating women. Pregnancy may occur in the absence of menstruation, as during lactation or before the menstrual function is established.

II. Digestive Disturbances.

Dyspepsia. Early months.

Nausea. Most commonly from first to end of third month.

A morning sickness, usually present for a longer or shorter time in the great majority of cases. A reflex from the uterus during its development in the lesser pelvis. Exclude pathological causes.

Ptyalism.—A reflex excitation of the salivary glands frequently accompanied with excessive secretion of mucus in the mouth and throat. Marked salivation is exceptional.

III. Certain Mammary Signs.—Enlargement, sense of prickling, tenderness, weight and fulness.

IV. Certain Abdominal Signs.—Enlargement, pigmentation, quickening.

PHYSICAL SIGNS.

I. Mammary.—Rarely all present. Of great value collectively in the primipara; of little use in women who have borne children, since many of the mammary changes remain in a measure permanent.

Size and Firmness.

Second month or earlier.*

Increase in size and firmness of the gland. The increase is due to development of the acini, swelling of the connective tissue, interlobular deposit of fat. Most significant when progressive. Distinguish from overlying fat by palpation. Identify the gland by its nodular border. Frequently this sign is not well marked after mid-pregnancy.

Exclude pathological enlargement.

Erectility of Nipple.

Second month.

Nipple becomes turgid and protuberant when lightly stroked with the finger.

Primary Areola.

Second month.

Becomes pigmented, elevated, œdematous. Depth of pigmentation varies with the complexion of the patient: is faintly developed in blondes, marked in brunettes, and nearly black in the negress.

Shades into the color of the skin at the upper and outer aspect of the areola at the end of the second month.

Of little value after the first pregnancy.

Exclude pathological reflexes from the pelvic organs.

Glandular Follicles : Montgomery's Follicles.—Second month.

These are hypertrophied sebaceous follicles;

Ten to twenty in number;

Situated in the primary areola.

Enlargement of Veins.

Second month.

Veins everywhere more prominent over the breast;

Coursing in across the primary areola.

Sometimes due to pathological reflexes from the pelvic organs.

* In this table of signs, end of month is meant unless otherwise indicated. The time given is that from which the sign is available except when otherwise specified.

Milk in the Breast.

Third month.

A milky serum may usually be pressed from the nipples.

Strong presumptive evidence in primiparæ.

Yet milk secretion is possible in the virgin or even in males.

Secondary Areola.

Fifth month.

A faintly pigmented areola around the primary areola.

Characterized by round, faintly marked, washed out spots immediately about the primary areola, especially at its upper and outer aspect. Due chiefly to enlarged and non-pigmented sebaceous follicles.

Diagnostic when well made out.

II. Abdominal.**1. Inspection.****Abdomen Flattened.**

In second month.

Uterus sinks lower in the pelvis.

Abdomen Enlarged.

From third month.

Uterus begins to rise out of the lesser pelvis.

Abdomen Pigmented.

Second month.

A pigmented line one-eighth inch wide from the pubes to the umbilicus or even to the ensiform cartilage. Not diagnostic. Exceptionally present in nulliparæ.

Umbilicus.

Retracted,

In first trimester.

Protruded,

In eighth and ninth months.

Lineæ Albicantes: Striæ Gravidarum.

Sixth month.

Irregular pinkish lines most marked over lower half of the abdomen.

Due chiefly to partial atrophy from tension.

Frequently present from other causes than gestation.

2. Palpation.**Size of the Tumor.**

Fundus at the pelvic brim,

Third month.

Near the umbilicus,

Sixth month.

At the ensiform cartilage.

Eight and a half months.

Measurements (see Farre and Tanner's table, page 30).

Character of the Tumor.

Smooth, symmetrical, ovoid or pyriform, fluid.

Detection of foetal parts in the last trimester and earlier.

Intermittent Contractions.

Fourth month.

Earlier by the bimanual.

Recur at intervals of five or ten minutes. Obtainable immediately by gentle friction.

Not interrupted by death of the fœtus.

Exclude hæmatometra, soft fibroids and distended bladder.

Contractions are believed to occur in the non-gravid uterus.

Active Fœtal Movements: Quickening.1. *As an objective sign.*

(a.) By abdominal palpation.

Fourth month.

Most promptly obtained by applying the hand cold to the abdomen, or by first tossing the fœtus from side to side.

(b.) By the bimanual.

Twelfth week.

Muscular movements begin tenth week.

This sign by either method may fail in hydramnion, and in certain other conditions; may be temporarily or persistently absent in normal cases.

Diagnostic when well made out.

2. *As a subjective sign.* Three to four and a half months.

Occurs earlier in multiparæ than in primiparæ.

Not wholly reliable as a subjective sign.

May be simulated by intestinal flatus, spasmodic contractions of the abdominal muscles or other causes. Rarely may wholly escape recognition.

Passive Fœtal Movements: External Ballottement.—Consists in tossing the fœtus or the fœtal head by abdominal palpation.

3. Auscultation.**Funic Souffle.**

Fourth month.

Synchronous with the fœtal pulse.

Origin. Impeded flow of blood in the cord, especially in the umbilical vein, probably due to pressure.

Uterine Souffle.

Ten weeks to four months.

A soft blowing murmur.

Synchronous with the maternal pulse.

Due to the current of blood in the uterine arteries and their branches.

Best heard usually over the lateral borders of the uterus, especially the left, owing to right torsion of the uterus.

Uterine fibroids, chronic metritis, or even ovarian cysts may give rise to a similar souffle.

A valuable sign in the absence of these conditions.

Choc Fœtal.

Three and a half to four months.

The shock of the fœtal movements, as perceived by the ear: resembles the sound produced by lightly percussing one hand, held against the ear, with a finger of the other hand.

The *bruit de choc fœtal* is a bruit that immediately precedes the choc fœtal.

Fœtal Heart-sounds.

Four and a half to five months.

By vaginal stethoscopy.

Twelfth week.

Rate, about double the maternal pulse, 120 to 150.

Generally loudest directly over the fœtal heart.

Audible over an area of about three inches in diameter, frequently over a larger area. The point at which the heart-tones are most distinctly heard is the focus of auscultation. There may be two foci even in single fœtation.

Heart sounds may be absent from death of the fœtus; may be temporarily inaudible from dorso-posterior positions, hydramnion or other causes.

Method. A still room.

Patient in dorsal decubitus with the thighs partially flexed.

Auscultation by mediate or immediate method—with or without stethoscope.

Listen over the fœtal dorsum.

Press the abdominal walls against the uterus. In dorso-anterior positions pressure on the breech may help by thrusting the dorsum forward.

Failing, repeat the examination at intervals of several hours or days.

A rhythmical succession of sounds of characteristic quality and rhythm, of double the maternal pulse-rate, and which can be counted, establishes the diagnosis of pregnancy.

III. Pelvic.

Dusky Hue of the Vagina.

Second month.

Most constantly found on the anterior wall immediately below the meatus urethræ.

Due to hypertrophy of the corpus cavernosum of the vestibule and of the vaginal venous plexuses.

Present in about five-sixths of all cases at the end of the third month.

Valuable when well defined.

Exclude pathological causes.

Softening of the Cervix.

Sixth week.

Is progressive from the lower border of the cervix upward.

Involves the whole cervix by the end of the eighth month.

Not always well defined in the early months.

May arise from pathological causes.

Canal of the cervix becomes progressively more patulous.

Changes in the Uterine Tumor.

Fourth to sixth week.

The most reliable signs obtainable in the second and third months are the changes in the size, shape and consistency of the uterus, due to the development of the globular ovum in its cavity, viz.:

Growth at the rate of pregnancy;

Globular shape of the body;

Compressibility, elasticity and fluctuation of the corpus uteri.

Distinguish from chronic metritis by greater density in the latter and by the history.

Distinguish from sub-involution in which the density is greater and the enlargement is mainly in length.

Distinguish from an anteфлекed and hyperæmic uterus, from hæmatometra and hydrometra and from a uterus containing a soft sub-mucous fibroid, by the history and the physical characters.

These signs are obtained by the bimanual.

The examination may require the aid of an anæsthetic in difficult cases.

Hegar's Sign.

Fourth to sixth week.

Compressibility and resiliency of the isthmus uteri, especially marked in the median line.

Method. Uterus depressed by the external hand, or drawn down by a volsella.

Thumb of the other hand in the vagina against the lower uterine segment at junction with cervix.

Finger in the rectum above the utero-sacral cul-de-sac.

Tissues between the thumb and finger may be compressed almost to the thinness of a visiting-card.

Examination may be facilitated by the use of an anæsthetic, and by distending the lower end of the rectum with water.

The compressibility of the isthmus may be made out by the use of the index finger of one hand in the anterior and of the other in the posterior vaginal fornix, the uterus being drawn down with a volsella; usually by the ordinary method of bimanual exploration.

Hegar's sign may be simulated by a flexed non-gravid uterus.

Pulsation of the Uterine Artery. Obtainable by the touch through the vaginal wall at one side of the cervix. Eliminate pathological causes.

Temperature of the Cervix.— $\frac{1}{2}^{\circ}$ to $\frac{3}{4}^{\circ}$ F. above that of the vagina.

Passive Fœtal Movements: Internal Ballottement.—Available in the fifth and sixth months or longer, according to the size and mobility of the fœtus. Earlier, the fœtus is too light; later, its mobility is too limited to permit of ballottement.

Method. Semi-recumbent posture, bladder empty and clothing loose.

Intravaginal finger against the anterior uterine wall above the cervix.

Fœtus tossed upward falls again and reперcusses the finger.

Distinguish from :

- Anteflexed uterus ;
- Pedunculated tumor of the ovary or uterus ;
- Internal projections of large cysts ;
- Floating kidney ;
- Stone in the bladder ;
- Pulsations of the vaginal artery.

May fail from :

- Scanty liquor amnii ;
- Abdominal presentation ;
- Placenta prævia ;
- Multiple fœtus or
- Other causes.

SUMMARY OF DIAGNOSTIC SIGNS.

- Mammary Signs Collectively, in first pregnancies.
- Intermittent Uterine Contractions ;
- Detection of Fœtal Parts ;

Active Fœtal Movements ;
 Changes in the Uterine tumor ;
 Hegar's Sign ;
 Internal Ballotement ;
 Fœtal Heart.

DIFFERENTIAL DIAGNOSIS.

In general, non-gravid tumors are distinguished by absence of the signs of pregnancy, especially the changes in the uterus peculiar to pregnancy.

Fat in the Abdominal Walls can be lifted in folds and moved over the abdominal muscles.

Phantom Tumor disappears under anæsthesia.

Tympanites generally subsides in the morning ;

Its percussion note is tympanitic ;

Palpation, negative ;

Abdominal walls can be gently pressed backward against the vertebral column.

Ascites. Abdomen flattened at the umbilicus—in the dorsal decubitus ;

Generally, tympanitic percussion at the summit of the tumor from flotation of intestines ;

Fluid wave through all parts of the tumor within the limits of the fluid ; in pregnancy the wave is interrupted by the fœtal mass ;

Changes of fluid level in different postures.

Tumors of Other Viscera. Tumor traceable from the normal situation of those viscera. Uterus easily differentiated.

Ovarian Cystoma. More marked fluctuation, generally, than in the tumor of pregnancy ; absence of fœtal parts ; uterus may be differentiated from the tumor.

Myomata of the Uterus. (a). Submucous, characterized by history of hemorrhage ;

Greater density of the tumor usually.

(b). Sub-peritoneal, surface of the tumor nodulated.

Slower growth in both varieties.

Pregnancy and myomata or other pelvic neoplasms may coexist.

PLURAL PREGNANCY.

Frequency of twins, 1-80 to 1-90 ; of triplets, 1-6000 to 1-8000. Quadruple and even quintuple pregnancies are possible.

The Viability of the children is less in multiple than in single fœtation. Twins are generally undersized and of unequal development.

Labor is premature in more than two-thirds of all cases of twin pregnancy.

Origin of Multiple Pregnancy. Three modes of origin. (*a*). From simultaneous rupture of two or more Graafian follicles in the same or in different ovaries.

(*b*). From two ovules in one follicle.

(*c*). From single ovule with a double germ.

Arrangement of Membranes and Placenta.—In twin fœtation from two ovules, there are two amnions, two chorions, two placentas. The placentas may fuse at their margins, each having an independent circulation.

In twin fœtation from a single ovule with a double germ, there is a single chorion containing two amnions; the placenta is single. Rarely there are two fœtuses in a common sac owing to destruction of the amniotic septum.

Children from the same ovule are always of the same sex.

Signs of Twins.

(*a*). **Abdominal Signs.**—Size and tension of the tumor:

Shape of the tumor—greater width: longitudinal sulcus—not diagnostic;

Suprapubic œdema—occurs also in simple hydramnion;

Multitude of small parts;

Two dorsal planes;

Three or four fœtal poles;

One head in the excavation and one in the upper uterine segment;

One head in the excavation and one in the iliac fossa;

Distance from pelvic pole to fundal pole over 12 inches;

Two fœtal heart-sounds of different rates;

Two fœtal heart-sounds of the same rate, but in widely different situations and on opposite sides;

Heart above the umbilicus and head in the excavation.

(*b*). **Vaginal Signs.**—Rapidly successive presentation of a head and a breech;

Four extremities presenting;

Two amniotic bags at the cervix.

The Diagnosis of Triplets is rarely possible.

Superfecundation is a twin pregnancy resulting from separate acts of insemination by the same or different males.

DURATION OF PREGNANCY.

The precise duration of pregnancy is not definitely known, since it is impossible to fix the date of fecundation.

Average interval between the beginning of last menstruation and labor is two hundred and eighty days ; more accurately, ten times the menstrual interval which is habitual with the patient.

Average interval between the fruitful coitus and labor is two hundred and seventy-three days.

A variation of at least twenty days above or below these averages is believed to be possible within physiological limits.

RULES AND METHODS FOR PREDICTING THE DATE OF LABOR.

Naegele's Rule.—Count forward nine calendar months from the beginning of the last menstruation and add seven days. Usually accurate within a week.

Prediction from Date of Quickening.—Count forward four and a half to five months from the time of quickening. Very liable to error.

Mensuration of the Uterus.—See p. 30. Also liable to error.

Mensuration of the Fœtus.—Measure the foetal ovoid. The length of the foetus is approximately double that of the foetal ovoid. Only fairly reliable.

Method. The measurement may be taken with considerable accuracy through the abdominal walls or by placing one pole of a pelvimeter against the head, through the vagina, and the other upon the abdomen over the breech.

Length of the foetus :

6th month,	12 to 14 inches ;
7th “	14 “ 16 “
8th “	16 “ 18 “
9th “	18 “ 20 “

HYGIENE OF PREGNANCY.

The pregnant woman should place herself under the direction of her physician from the first months of pregnancy; should consult him frequently during the latter months.

Rules of Hygiene. Most important are: Open air exercise for one or two hours daily, with care to avoid exhaustion and violent muscular exertion;

Avoidance if possible of depressing emotions, and all injurious mental influences; regularity of meals; proper quantity and quality of food; daily evacuations of the bowels; eight hours of sleep daily; pure air at all times; a tepid sponge bath twice weekly in winter, once daily in the summer months—should be taken in a warm room, and with plenty of friction to secure full reaction.

A vaginal injection of a quart of water at a temperature of 98° F., or of a weak borax solution (ʒss ad oj) may be used once or twice daily in case of irritating leucorrhœal secretions.

Clothing. Light flannel underwear at all seasons; outer clothing to suit climatic changes; avoidance of tight clothing especially about the breasts and abdomen.

Care of the Nipples. During the last two months or more the nipples should be cleansed daily with a borax solution—tablespoonful to the pint of water. They may be anointed with fresh cocoa butter after cleansing and, if small or sunken, they should be gently drawn with the thumb and fingers.

Marital Relations during pregnancy are liable to do harm; may cause abortion or premature labor.

PATHOLOGY OF PREGNANCY.

DISEASES OF THE DECIDUÆ.

Acute Endometritis.—Cause, acute febrile disease; frequently attended with hemorrhage; often results in abortion.

Chronic Diffuse Endometritis.—Most frequently attacks the decidua vera: attended with proliferation of decidual cells and of the connective tissue.

Polypoid Endometritis.—Characterized by polypoid growths in addition to the lesions of simple diffuse endometritis; terminates in abortion if the chorionic villi become involved.

Cystic Endometritis.—Distinguished by formation of retention cysts and by obstruction of the gland ducts through proliferation of inter-glandular connective tissue.

Catarrhal Endometritis.—Marked by discharges of thin, watery mucus from the uterus—*hydrops rhea gravidarum*; most common in the later months of gestation. The fluid collects usually between the chorion and the decidua.

Atrophy of the Decidua is of very rare occurrence.

ANOMALIES OF THE AMNION AND THE LIQUOR AMNII.

Oligo-hydramnion. deficiency of liquor amnii. The normal quantity of amnial liquor at term is about two pints. Deficiency of liquor amnii may be attended with adhesions between the amnion and the fœtus and with the formation of amniotic bands. Intra-uterine amputation of fœtal extremities and grave faults of fœtal development may result from these bands and adhesions.

Hydramnion, an excess of liquor amnii over four pints.

Causes. Among the causes assigned are abnormal persistence of the vasa propria (a capillary network of the placental portion of the chorion immediately underlying the amnion, normally present in the early months of gestation,) excessive urinary secretion, excessive excretion of the fœtal skin, amniotitis, transudation from the maternal blood, deficient absorption of liquor amnii.

Diagnosis. Distinguish from ascites, ovarian cyst, twins, by palpation and auscultation of the tumor and by the history.

Prognosis. Unfavorable for the child, owing to malformations and malpresentations, which are common in hydramnion.

Treatment. In case of alarming symptoms from over-distention, puncture the membranes, guarding against syncope from too rapid escape of liquor amnii. On birth of the child precautions may be needed to prevent post-partum hemorrhage.

DISEASES OF THE CHORION.

Vesicular Mole: Hydatidiform Mole.—An hypertrophy and myxomatous degeneration of the chorial villi with the formation of cysts. The cysts vary in size from that of a millet seed to a grape—may reach the size of a hen's egg. Their contents is a watery fluid containing albumen and mucin. The degeneration begins in the very first weeks of gestation.

Etiology, obscure. The cause apparently resides wholly in the ovum. Endometritis, syphilis and absence of allantoic vessels, commonly assigned as causes, probably have no part in the etiology.

Prognosis. Maternal mortality, ten to fifteen per cent., from hemorrhage, sepsis or rupture of the uterus. Except in rare cases of partial degeneration the foetus invariably dies. The degenerated ovum may be retained for many months; usually is expelled before the sixth.

Diagnostic Signs. Signs of pregnancy;

Abdominal enlargement out of proportion to the period of gestation—uterus too large the first three months, later too small;

Absence of ballottement, of the foetal heart, foetal parts and foetal movements;

Uterus usually boggy;

Sanguineous discharge;

Discharge of cysts—rarely noted;

Detection of the cysts by exploration of the uterine cavity.

Treatment. As a rule, empty the uterus.

Dilate the cervix and evacuate with the hand, cautiously, since the uterine wall is often extremely thin. Curette after considerable retraction has taken place.

Wash out with a hot antiseptic douche.

Swab the cavity with tincture of iodine.

Give ergot if required.

ANOMALIES OF THE PLACENTA.

Placenta Membranacea. The villi persist over the entire surface of the chorion. Placenta thinner than normal.

Placenta Prævia. Implantation in the lower uterine segment.

Placenta Succenturiata. One or more wholly or partially independent cotyledons.

Cysts. Of common occurrence. The cysts are small and seated beneath the amnion: probably developed from foetal villi.

Syphilis. Placenta larger and paler than normal. Always dangerous, frequently fatal to the foetus.

Infection before conception affects only the maternal placenta, as a rule.

Infection during the fruitful coitus affects the entire placenta and the foetus.

Infection by the spermatozoid may affect the foetal placenta and the foetus. The disease may extend to the maternal placenta and the mother.

Infection during gestation affects the maternal placenta; may extend to the foetal placenta and the foetus. Infection shortly before labor, however, may affect neither foetus nor placenta.

Edema. May occur in hydramnion, occlusion of umbilical veins, or maternal anasarca.

Apoplexy. Extravasations of blood into the placenta may occur at one or several points; may cause abortion. Causes, nephritis, pelvic congestion, mechanical violence.

Myxomatous degeneration usually involves only a part of the placenta.

Fatty degeneration. Causes, endometritis, placental hemorrhage, chronic inflammation of the placenta. May result in the death of the foetus.

Acute placentitis, rare.

Calcareous degeneration, common and unimportant.

White infarcts, very common. Unimportant when small and few in number. When extensive may cause death of the foetus. Cause, local degeneration of decidua.

ANOMALIES OF THE UMBILICAL CORD.

Length. Too long a cord may predispose to prolapse, to knots or coils about the fœtus and possible obstruction in the funic vessels. Too short a cord may lead to premature separation of the placenta during labor.

Excessive Torsion may cause occlusion of vessels; yet in most cases excessive torsion takes place after the death of the fœtus.

Knots occur rarely. They are seldom tight enough to endanger the fœtus.

Navel Cord Hernia. Hernial protrusion of abdominal viscera may take place into the cord. They are usually accompanied with other errors of fœtal development.

Cysts may be found in the sheath of the cord. They are caused by liquefaction of mucous tissue or by blood extravasations.

Coils about the fœtus, especially the neck, are of common occurrence. Rarely is the circulation impeded either in the cord or the girdled member. Extensive coilings may give rise to the dangers of short cord.

Insertion may be eccentric, marginal, velamentous. In the latter anomaly the vessels pass for some distance between the membranes to the edge of the placenta. As they are more or less separated and unprotected they are liable to be torn during labor.

PATHOLOGY OF THE FŒTUS.

Anomalies of Development.

(a) *Hemiteria.* Literally, half monstrosity. This class includes dwarfs and giants, microcephalus, sternal fissure, spina bifida, encephalocele and other hernial protrusions; club foot, patulous foramen ovale, imperforate rectum, vagina, œsophagus, webbed fingers or toes, hare-lip, cleft palate, epispadias, hypospadias, supernumerary fingers or toes, etc.

(b) *Heterotaxia.* Lateral transposition of viscera.

(c) *Hermaphrodism.* Having the anatomical characteristics of both sexes.

(d) *Monsters.*

1. Ectromelic Monster. Having one or more aborted limbs.

2. Symelic Monster. Having its lower limbs more or less completely united.

3. Celosomatic Monster. Having complete or partial eventration.
4. Exencephalic Monster. One in which the brain is malformed and protruding from the cranial cavity.
Pseudencephalic Monster. One in which the cranial vault and the larger part of the brain are absent.
5. Anencephalic Monster. One in which the cranial vault and the entire brain are wanting.
6. Cyclocephalic Monster. A monster in which the nose is absent and the eyes are partially fused into one.
7. Octocephalic Monster. In this monster the ears meet or are fused in the median line.
8. Omphalositic Monster. This monster is one of twins, having a parasitic existence *in utero*. It derives its nourishment from the companion foetus, and is incapable of living independently after the cord is divided. This monstrosity owes its origin to the fact that the circulation of one foetus has overpowered and reversed that of its companion.
9. Double Monster. Union of two foetuses.
Varieties: (*a*). Sternopagus, union at the sternum; (*b*). Ischiopagus, union at the pelvis; (*c*). Cephalopagus, union at the head; (*d*). Xithopagus, union at the xiphoid cartilage.
Syncephalic. Heads partially fused, bodies separate.
Monocephalic. Heads completely fused, bodies separate.
Synsomatic. Bodies partially fused, heads separate.
Monosomatic. Bodies wholly fused, heads separate.
Double Parasitic Monster. One foetus attached as a parasite to the other, or inserted or included in it.

Diseases of the Fœtus.

Pathogenic germs in the mother's blood may traverse the placenta. Most infectious diseases are, therefore, possible in intra-uterine life. The foetus is also liable to many other diseases, such as valvular affections of the heart, serous inflammations with effusion, rachitis, neoplasms, etc.

Death of the Fœtus.

Signs.—Recession of the signs of pregnancy :

Uterus doughy ;

Peptonuria ;

Cervical temperature not above the vaginal ;

Absence of foetal heart ;

Absence of active fœtal movements—examine by abdominal palpation and by the bimanual;

Looseness and crepitation of cranial bones.

Habitual Death of the fœtus. Cause, in the vast majority of cases (83 per cent.), syphilis in one or both parents. Possible causes are chronic endometritis or metritis, nephritis and others. The most important signs of fœtal syphilis are osteo-chondritis, especially between the head and shaft of the femur, enlargement of the liver (often to one-twelfth the body-weight), enlargement of the spleen.

Treatment in death of the fœtus. Empty the uterus.

ABORTION AND PREMATURE LABOR.

Definition of Terms.—*Abortion*, expulsion of the ovum in the first trimester.

Miscarriage, expulsion during the second trimester.

Premature Labor, expulsion during the third trimester.

The terms abortion and miscarriage are commonly used interchangeably.

Abortion.

Frequency.—Not far from 20 per cent. of all pregnancies end in abortion.

A large proportion of abortions occur at the end of the second month.

Causes.—1. Death of the fœtus from malformation, disease, mechanical violence, maternal toxæmia, morbid conditions of the placenta, abnormalities of the chorion, of the cord, the membranes.

2. Causes acting independently of the death of the fœtus:

Reflex irritation of the uterus;

Oxytocics;

Placenta prævia;

Epileptiform convulsions from uræmic or other causes;

Carbonic dioxide poisoning;

Placental apoplexies;

Pelvic adhesions;

Fibroids of the uterus;

Carcinoma of the uterus;

Misplacement of the uterus;

Over-distension from hydramnion or multiple pregnancy;

Direct interference ;

Falls or blows ;

Hyperæmia of the pelvic organs from circulatory obstruction in the lungs or liver, cardiac disease, violent muscular exertion, sexual excesses, etc., causing hemorrhage into the placenta.

Diagnosis.—*Symptoms :*

Hemorrhage ;

Rhythmical uterine pains ;

Chill.

Physical Signs :

Cervix softening ;

Cervix dilating ;

Ovum protruding.

The physical signs make the diagnosis of inevitable abortion.

Severe rhythmical pains with hemorrhage almost surely result in abortion.

Examine clots, breaking them up under water, for fœtus or fœtal appendages.

Prognosis.—Always favorable in well-managed cases, yet many deaths occur from mismanagement.

Dangers, hemorrhage, septicæmia.

Hemorrhage contributes to the fatal issue, though rarely the immediate cause of death.

(a). **Treatment: Prophylaxis**, or management of cases with a history of previous abortions.

Seek the cause of former abortions.

Syphilis, misplacements of the uterus and nephritis are the most frequent causes of habitual abortion.

Treat syphilis as in other cases. Correct uterine misplacements.

In chronic nephritis the uterus should generally be emptied.

Guard the menstrual dates.

Prevent the causes of pelvic congestion, especially sexual intercourse, till the critical period has passed.

(b). **Arrest of Threatened Abortion.**—Absolute rest, maintaining a recumbent position.

Uterine rest by the rectal use of opium, gr. i, or its equivalent. p. r. n., or, pil. extract. viburni prunifolii. grs. 4, q. 2 h., or rectal use of the fluid extract ʒss, q. 2 to 4 h.

Remove the causes.

In case of dead foetus or vesicular degeneration of the chorion, empty the uterus.

(c). **Management of Actual Abortion.**—Chief objects of treatment, the prevention of

1. Hemorrhage ;
2. Septicæmia.

Agents for controlling hemorrhage :

1. Rest;
2. Vaginal tampon, simple or styptic ;
3. Cervical tampon, together with vaginal ;
4. Evacuation of the uterus as soon as the ovum is separated, or nearly so, by the aseptic finger or curette.

Means for preventing or arresting sepsis :

1. Continuous disinfection of the uterus :
2. Avoidance of preventable lacerations and abrasions ;
3. Early evacuation of the uterus.

Expectant Plan.—*Indications.* Ovum not detached ; hemorrhage slight ; absence of septic or putrefactive fluids.

Method. Maintain asepsis. Aseptic vaginal tampon may be used if required as a prophylactic against hemorrhage.

Method of Tamponade. Sims' position and Sims' speculum : material for tampon, sterilized cotton wool, used wet and in pledgets size of a chicken's egg. Pack a row of pledgets in the fornix, around the cervix, and build up from this till the vagina is filled. Press the tampon away from the urethra and base of the bladder to prevent vesical irritation. Hold in place with a T bandage. Sterilized gauze in strips, two and a half inches in width and five yards in length, may be used instead of cotton wool. The simple aseptic tampon must be renewed every eight hours. A tampon impregnated with zinc oxide may stand twenty-four hours. Mercurials must not be used in the tampon. This plan failing, after one or two days empty the uterus with curette and forceps : sooner for cause.

Radical Plan.—*Indications.* Cervix dilated ; ovum detached, or presenting or partially expelled ; dangerous hemorrhage ; sepsis present or imminent.

Necrotic material carried for three or four days in the uterus exposes the woman to the dangers of a metro-salpingitis—possibly to a fatal septicæmia.

Manual Method. Anæsthetic if necessary. Depress and fix the uterus by one hand over the abdomen. Empty the cavity with one or two fingers of the other hand aseptically.

Instrumental Method. Sims' position, Sims' speculum, straight dressing-forceps with joint two and a half inches from the distal end; Anæsthesia if required;

Catch anterior lip of the cervix with a volsella and hold gently forward;

Sterilize the vagina and the uterine cavity;

Separate the ovum with the curette;

Extract with the dressing-forceps;

Thoroughly curette the uterine cavity;

Douche the uterus with a hot mercurial solution and follow with plain hot water;

Swab with tr. iodin. in case of hemorrhage not controlled by the curette;

Leave twenty grains of iodol, aristol or iodoform in the uterus.

Interference must be practised cautiously in the presence of a peri- or parametritis.

After-Treatment.—Rest in bed for a week or more. Maintain asepsis.

Premature Labor.

Management the same as in term labors.

Hyperemesis: Pernicious Vomiting.

Etiology.—In part a neurosis. The severest forms are probably due in part to certain anatomical lesions, such as:

Uterine misplacement;

Detention of the uterus in the pelvis, by adhesions or otherwise;

Decidual endometritis;

Induration of the cervix;

Erosion or inflammation of the cervix.

Peri- or parametritis or the ordinary causes of vomiting—intra-cranial, gastric, hepatic, intestinal, peritoneal, renal or others—are frequently the principal factors.

Prognosis.—The majority of cases recover by the third or fourth month, when the uterus rises out of the pelvis.

The prognosis is grave in the worst forms.

Treatment. (a). *Dietetic Measures.* Humor the appetite;

Breakfast in bed, followed by sleep;

Sherry wine before rising;

Strong coffee before rising;

Cold carbonic acid water or Vichy, plain or containing an alkaline bromide, 3j to the syphon;

Other dietetic measures as practised in ordinary vomiting.

(b). *General Therapy.* Rest in bed for several days;

Cocaine, gr. $\frac{1}{8}$ to $\frac{1}{4}$, three or four times daily, or hourly till three or four doses are taken;

Cocaine spray to the pharynx, one per cent. solution;

Chloral, gr. xx to xxx, in solution, by the rectum, repeated p. r. n.; best given in milk: the bromides in similar doses;

Oxide of silver, gr. $\frac{1}{4}$ to $\frac{1}{2}$, four times daily, on an empty stomach:

Morphia, hypodermically or endermically, over the epigastrium, especially if there be local tenderness;

Strychnia or nux vomica before meals, in chronic gastric catarrh;

Calomel in full dose or in small repeated doses;

Oxalate of cerium, gr. x, q. 2 vel 4 h., in mild cases;

Bismuth subnitrate in similar doses;

Ether spray to the epigastrium at the beginning of each paroxysm;

Ice bag to the cervical vertebræ;

Blister over the fourth or fifth dorsal vertebræ;

Inhalation of oxygen;

Faradic current through the stomach;

Other measures such as are used in the treatment of ordinary vomiting.

(c). *Local Measures.* Pencil cervical erosions with a twenty grain solution of nitrate of silver every second day;

Correct malpositions of the uterus.

Galvanism. Anode against the cervix, cathode over the lower dorsal vertebræ; current strength three to five milliamperes; sitting five minutes. Repeat twice daily.

Cocaine, twenty per cent. solution, applied freely upon the portio vaginalis and within the cervix.

Combine, with cocaine, Copeman's method of dilatation of the

cervix below the os internum. This treatment may result in abortion.

Artificial Abortion as a last resort. This procedure must never be adopted except with the concurrence of competent council.

Methods of inducing abortion. Puncture of the membranes or partial separation of the ovum with a clean sound. Packing the cervix with iodoform gauze.

Rectal Alimentation may tide the patient over a crisis when stomach-feeding is impossible. Beef blood, beef juice, Leube's meat solution or predigested milk, $\frac{3}{4}$ iv., q. 6 h. Small doses of opium may sometimes be added to the nutrient enemas with advantage. Wash out the rectum daily during rectal feeding.

Ptyalism.

Treatment. Saturated solution of potassium chlorate as a mouth-wash.

Atropia, gr. $\frac{1}{64}$, once to three times daily.

Bromides, gr. xxx to cxx daily.

Usually relieved by treatment which relieves the nausea.

Anæmia.

Treatment. Iron, pil. Blaud, 1 or 2, t. i. d.; albuminate of iron in liberal doses.

Citrate of iron, subcutaneously.

Arseniate of iron, gr. $\frac{1}{20}$, t. i. d.

Generous diet.

Varices of the Lower Extremities.

Treatment. Support by bandage or elastic stockings.

Pruritus Vulvæ.

Treatment. Hot fomentations to the vulva.

Dust the vagina and vulva with subnitrate of bismuth once in one or two days.

Exclude diabetes.

ECTOPIC GESTATION: EXTRA-UTERINE PREGNANCY.

TUBAL PREGNANCY.

In this anomaly the impregnated ovum lodges and develops in the Fallopian tube.

Causes.—Sacculation of the tube; obstruction; most frequently impaired propelling power, due to a chronic salpingitis

which has resulted in denudation of epithelium and crippled peristalsis.

Clinical Course.—(a). *Pregnancy in the free portion of the tube* terminates almost invariably before the fourteenth week :

1. Rarely by death of the ovum without tubal rupture ;
2. Usually by rupture of the tube.

Rupture may take place :

1. Into the peritoneum ;
2. Into the broad ligament.

In either event more or less hemorrhage occurs from the tubal rent.

In the latter the bleeding is at the most necessarily limited.

Intraperitoneal rupture may terminate in :

1. Spontaneous arrest of hemorrhage and recovery ;
2. Continuous hemorrhage and death.

Intraligamentous rupture may result in :

1. Immediate death of the ovum and blood collection—pelvic hæmatoma.
2. Continued development—intraligamentous pregnancy.

Intraligamentous pregnancy :

1. May go to term. Spurious labor then occurs and the child dies.
2. May become intraperitoneal by secondary rupture. Fœtus rarely survives secondary rupture.
3. May die and be absorbed.
4. May die and suppurate. A suppurating ovum may be discharged piecemeal through the abdominal wall, vagina, bladder, rectum ; may terminate in septicæmia and death.
5. May die at or near term and be carried indefinitely as a lithopædion.

(b). *Pregnancy in the intramural portion of the tube*—tubo-uterine pregnancy—interstitial pregnancy—terminates before the fifth month :—

1. By intraperitoneal rupture and fatal hemorrhage.
2. Possibly in rare cases by extrusion or rupture into the uterus.

Diagnosis of Tubal Pregnancy.—**Signs :** (a). *Early Months :* Frequently a long period of sterility immediately preceding ;
Suppression of catamenia and other signs of pregnancy ;

Pain in paroxysms which are abrupt, most violent, supervening upon apparent health, cramp-like in character and generally referred to the seat of the fruit-sac, the more acute and final paroxysms being attended with collapse and the signs of internal hemorrhage ;

Genital hemorrhage, usually in gushes of larger or smaller amount, especially at the times of the painful paroxysms : a more or less copious discharge of blood usually attends the rupture of the fruit-sac ;

Expulsion of a decidual cast, entire or piecemeal : verify, by microscope, the absence of foetal villusites ;

Uterus :

Displaced, according to the size and situation of the fruit sac ;

Enlarged—with rare exceptions ;

Empty ;

Cervix open.

Tumor—beside or behind the uterus :

Tense ;

Tender ;

Fluid ;

Rapidly growing.

(*b*). *Latter Months* : Foetal movements more distinct than in utero-gestation ;

Foetal heart-tones more intense ;

Foetus more accessible to palpation ;

Ballottement in the fourth and fifth months.

Shrinkage of the tumor under observation implies the death of the foetus.

Intraperitoneal rupture is succeeded usually by abdominal tenderness and evidence of moderate peritonitis. Extra-peritoneal rupture is distinguished by the development of a tumor in one broad ligament.

Explore the uterine cavity before opening the abdomen. Bear in mind that intra- and extra-uterine pregnancy may coexist.

Exclude ovarian cyst, ovarian abscess, dermoid cyst, intraligamentous cyst, pedunculated fibroid of ovary or uterus, retroflexion or lateroflexion of a gravid uterus, fluid accumulations in the tube.

Treatment of Tubal Pregnancy.—(a). **Before Primary Rupture.** *Feticide by Electricity*, without puncture.

Methods. 1. Faradic current. One electrode on the abdomen, over the tumor, one in the vagina or rectum beneath it. Strength of current, all the patient can bear. Sitting, half to one hour. Repeat daily till the tumor shrinks.

2. Galvanic current. Electrodes as above. Uninterrupted current, fifty to one hundred milliamperes. Sitting, fifteen minutes. Interrupted, one hundred and twenty periods per minute, fifteen to thirty milliamperes. One sitting may suffice.

Laparotomy, as an alternative, or in case of hemorrhage or sepsis after feticide by electricity.

(b). **After Rupture into the Peritoneum.**—*Immediate Laparotomy.* Method of operating. In case of extreme anæmia and collapse, prepare the patient by auto-transfusion, *i.e.*, bandaging the extremities; hypodermic injection of morphia, gr. $\frac{1}{4}$, or strychniæ sulphas, gr. $\frac{1}{30}$, or trinitrin, gr. $\frac{1}{100}$ to $\frac{1}{25}$.

Open the abdomen by incision of two or three inches in the median line.

Determine the presence of blood by inspection through the uncut peritoneum or by means of a pipette passed through a minute opening in the peritoneum.

Divide the peritoneum, lift the fruit-sac and the free end of the tube, tie the broad ligament behind the tumor and amputate. Cauterize the cut end of the tube, stay all hemorrhage, cleanse the peritoneal cavity, and close the abdomen.

Laparotomy being impracticable, treat by quiet, sand bags on the abdomen over the fruit-sac, compression of the aorta. In a certain proportion of cases spontaneous arrest of hemorrhage and recovery are possible.

(c). **After Rupture into the Broad Ligament.**—1. *Fætus Living.* Before end of third month, electrical feticide. Later, expectant.

2. *Fætus Dead.* If sepsis develops open the cyst, extraperitoneally if possible, through the abdominal wall. If the sac is within easy reach by the vagina, elytrotomy may be preferred.

(d). **After Secondary Rupture**, with dangerous hemorrhage, laparotomy. Cleanse the peritoneum, arrest hemorrhage, and drain the sac.

(e). **At or Near Term.**—1. *Fœtus Living.* Laparotomy. Control the placental site by hemostatic suture and remove the placenta and as much of the sac as practicable.

Close remainder of the sac and drain through the vagina or through the abdominal wound.

When removal of the placenta is impracticable, stitch the sac to the abdominal wound and drain by Mikulicz's method.

2. *Fœtus Dead.* Wait for obliteration of the placental vessels, if the patient is doing well, two or three months or indefinitely.

(f). **After Term.**—Laparotomy several weeks after the death of the fœtus, or only on the development of dangerous symptoms. Stitch the sac to the edges of the abdominal incision. Removal of the placenta being impracticable, drain by both abdominal wall and vagina. Keep the sac clean by antiseptics and by frequent irrigation.

(g). **Interstitial Variety.**—If diagnosis is possible, the pregnancy may sometimes be safely terminated by evacuating the fruit-sac through the uterine cavity.

On intraperitoneal rupture, laparotomy is indicated as in ordinary tubal pregnancy, and supravaginal amputation of the uterus may be required.

Treatment of Pregnancy in Rudimentary Uterine Cornu.
—Laparotomy and amputation of the supplementary cornu.

ABDOMINAL PREGNANCY.

May occur as a rare result of secondary rupture. Abdominal pregnancy in the sense of primary implantation and development of the ovum upon the peritoneum is of extremely doubtful occurrence.

OVARIAN PREGNANCY.

The development of the ovum within the ovary has in one or two cases been apparently demonstrated.

PHYSIOLOGY OF LABOR.

MECHANISM.

The mechanical factors of labor are: the Powers, the Passages the Passenger.

I. Expelling Powers.

1. Muscular action of the uterus, involuntary, the sympathetic being the chief motor nerve of the uterus; peristaltic, but nearly simultaneous, beginning at the fundus probably.

2. Muscular action of the abdominal walls, voluntary in part, partly a reflex involuntary contraction.

The chief expelling force is the contraction of the unstriped muscular fibers of the uterus.

The power of a uterine contraction, together with that of the abdominal muscles is fifty to eighty pounds (Duncan); according to Schatz, seventeen to fifty-five pounds.

II. Passages.

1. Hard Parts or Bony Pelvis;
2. Soft Parts.

Obstetric Anatomy of the Bony Pelvis.

The Pelvis is a strong, bony basin, whose cavity forms the most important part of the birth canal.

Constituent Parts are the ossa innominata, the sacrum, the coccyx.

Joints are the symphysis pubis, sacro-iliac joints, sacro-coccygeal joint.

A slight mobility of the pubic joint is usually present in the latter months of gestation.

Recession of the coccyx occurs during expulsion of the fœtal head from the outlet to the extent of one half to one inch.

False Pelvis: Greater Pelvis.—That part of the pelvis above the ilio-pectineal line. It forms with the lower segment of the abdominal wall a funnel-shaped approach to the true pelvis.

True Pelvis: Lesser Pelvis.—That part of the pelvis below the ilio-pectineal line.

Pelvic Brim, Inlet, Superior Strait, Isthmus, Margin.—Located by the linea ilio-pectinea and the upper border of the sacrum. Shape, approximately heart-shaped. Sometimes oval or more or less rounded.

Landmarks at the Brim. Promontory of the sacrum, or sacro-vertebral angle, due to the wedge shape of the last lumbar cartilage and of the fifth lumbar vertebra :

Sacro-iliac joints ;

Ilio-pectineal eminences, situated at the ilio-pubic joint, on the pubic bone ;

Symphysis pubis.

Outlet of the Pelvis, or Inferior Strait.—Lozenge shaped and located by the tip of the sacrum, the subpubic arch and the ischial tuberosities. A double triangle whose common base is a line connecting the ischial tuberosities, the apex of one, a point just below the pubic arch, the apex of the other, the tip of the sacrum.

Landmarks at the Outlet. Tip of the coccyx ;

Subpubic arch, formed by the two descending rami of the pubes ;

Ischial tuberosities ;

Ischial spines ;

The greater and lesser sacro-sciatic ligaments which assist in completing the parturient canal partly formed by the bones ;

The greater arise from the posterior, inferior spines of the ilium and from the sides of the sacrum and coccyx, and are inserted into the inner surfaces of the ischial tuberosities.

The lesser lie in front of the greater. They arise from the sides of the sacrum and coccyx, and are inserted into the spines of the ischium. The greater sacro-sciatic foramen transmits the pyramidalis muscle and the gluteal the sciatic and pudic vessels and nerves. The lesser transmits the tendon of the obturator internus muscle and the pudic vessels and nerves.

The obturator foramen, bounded by the rami of the ischium and pubes ; closed by the obturator membrane except at the obturator canal.

Cavity.—Bounded posteriorly, in the main, by the sacrum and the coccyx ;

Anteriorly, by the pubes, the pubic and the ischial rami ;

Laterally, by the surfaces of the iliac and ischial bones.

The posterior wall is smooth, and concave from above downward. Its depth is four to five inches—five and a half measured on the curve of the sacrum and coccyx.

The anterior wall is smooth, and concave from side to side. Its depth at the symphysis pubis is one and three-fourths inch.

Planes.—*The Plane of the Brim* cuts the ilio-pectineal line and the upper border of the sacrum.

Inclination of the brim to the horizon is about 60° , but is variable.

The Middle Plane cuts the middle of the posterior surface of the pubic symphysis and the upper margin of the third piece of the sacrum.

The Plane of the Outlet cuts the tip of the sacrum, a point just below the lower end of the symphysis pubis, and the ischial tuberosities.

A line from the tip of the coccyx to the subpubic arch makes an angle of about 11° with the horizon.

PELVIC DIAMETERS AND MEASUREMENTS.

Internal Diameters. (a). At the Brim. True Conjugate. From the promontory of the sacrum to the upper end of the symphysis, more exactly to the point at which the symphysis is crossed by the linea ilio-pectinea.

Diagonal Conjugate. From the promontory of the sacrum to the summit of the subpubic arch.

Transverse Diameter. The greatest transverse diameter. It cuts the points midway between the sacro-iliac joint and the ilio-pectineal eminence on either side.

Oblique Diameters. From the sacro-iliac joints, respectively, to the opposite ilio-pectineal eminence ; R. O. from the right, L. O. from the left sacro-iliac joint.

(b). At the Middle Plane: Antero-posterior Diameter. From the upper margin of the third piece of the sacrum to the middle of the posterior surface of the pubic symphysis.

Transverse Diameter. Between points corresponding to the lower margins of the acetabula.

Oblique Diameters. From the centers of the greater sacro-sciatic foramina, respectively, to the center of the obturator membrane opposite.

(c). *At the Outlet: Antero-posterior Diameter.* From a point about a half inch below the lower end of the pubic symphysis to the tip of the sacrum.

Transverse Diameter. Between the tubera ischiorum.

Oblique Diameters. Middle of the lower edge of the greater sacro-sciatic ligaments, respectively, to the point of union between the ischium and pubes on the opposite side.

External Diameters: External Conjugate Diameter: Diameter of Baudelocque. From the fossa just below the spinous process of the last lumbar vertebra to the most prominent point on the surface overlying the upper portion of the pubic symphysis—a prolongation of the internal conjugate. To locate the spinous process of the last lumbar vertebra draw a line connecting the depressions corresponding to the posterior superior iliac spines. The second spinous process above this line is that of the last lumbar vertebra.

Ilio-spinal or Inter-spinal Diameter. The distance between the anterior superior spines of the ilia measured from the outer borders of the sartorii at their origin.

Ilio-cristal or Inter-cristal Diameter. In the normal pelvis the greatest external diameter of the pelvis measured transversely at the crests.

APPROXIMATE MEASUREMENTS OF THE STATIC OR DRIED PELVIS.

INTERNAL.

Antero-posterior.	Oblique.	Transverse.
Brim, 4 inches.	$4\frac{1}{2}$ inches.	5 inches.
Outlet, 5 “	$4\frac{1}{2}$ “	4 “

The right oblique diameter at the brim is slightly longer than the left oblique.

APPROXIMATE MEASUREMENTS OF THE DYNAMIC PELVIS.

(A.) INTERNAL.

The internal diameters are diminished a quarter of an inch by the presence of the soft parts, in the dynamic pelvis.

The transverse diameter at the brim is still more reduced by the psoas and iliacus muscles.

The oblique is the longest diameter in the dynamic pelvis.

The pelvic capacity is still further reduced by the contained viscera and the cellular structures.

(B.) EXTERNAL.

External conjugate, 8 inches.

Inter-spinal, 10 "

Inter-cristal, 11 "

Average circumference, measured over the symphysis, just below the iliac crests and across the middle of the sacrum, one yard.

To estimate the internal conjugate from the external, deduct from two and three-quarter to five inches for the thickness of the bony structures and overlying soft parts.

The transverse diameter at the outlet may be measured externally by taking the distance between the inner aspects of the tubera ischiorum, measured on a line drawn through the anterior margin of the anus.

DIFFERENCE BETWEEN THE MALE AND FEMALE PELVIS.

Distinguishing marks of the female pelvis;

As a whole: False pelvis wider;

True pelvis larger in all diameters and of shallower depth;

Bones lighter and more slender;

Pelvic inclination greater.

Brim; Sacro-vertebral angle less prominent;

Pubic spines farther apart.

Cavity less funnel shaped;

Sacrum shorter and broader, and more strongly curved.

Outlet; Greater width of subpubic arch—75°, male 58°:

Symphysis pubis little more than half the depth of the male.

Obstetric Anatomy of the Pelvic Soft Parts.

At the Brim. The iliacus and psoas muscles encroach upon the lateral margins of the inlet to the extent of a quarter of an inch, or more, on each side.

The external iliac vessels lie on the inner borders of these muscles.

In the Cavity. There are no muscular structures over the median portion of either the anterior or posterior pelvic walls.

On either side of the median portion lie the pyriformis posteriorly, and the obturator internus anteriorly and laterally, too thin to affect the pelvic diameters.

At the Outlet. The outlet is closed by the pelvic floor or diaphragm which is made up chiefly of muscles and fasciæ.

THE PELVIC FLOOR.

The upper aspect of the pelvic floor is concave; its lower, convex from before backward.

Its upper limit is the peritoneum, except where that structure is lifted off to be reflected over the pelvic viscera and their appendages. Its lower surface is skin.

At its median portion it is obliquely traversed by three muscular slits, the urethra, the vagina, the rectum, all approximately parallel with the pelvic brim, except that the lower end of the rectum turns backward nearly at a right angle with the vagina.

The posterior vaginal wall and the soft structures behind it constitute the sacral segment of the pelvic floor; the anterior wall of the vagina and the soft parts in front of it, the pubic segment of the pelvic floor. (Hart.)

Measurements. Coccyx to anus, in the nullipara, one and three-quarters inch; anus to lower edge of vulvar orifice, in the nullipara, one and a quarter inch—in parous women, one inch—in the primigravida at term, one and a half inch.

Greatest transverse width, on the bis-ischial line, four and a quarter inches.

Perpendicular thickness of the pelvic floor at the anus, two inches.

Average projection of the pelvic floor, below a line drawn from the tip of the coccyx to the lower end of the symphysis, is about one inch.

Length of the sacral segment during labor at the moment of expulsion—coccyx to lower edge of the vulvar orifice—is six to seven inches.

Principal Component Structures: Internal or Superior Pelvic Fascia. Immediately underlying the peritoneum, and continuous with the iliac fascia, it is attached laterally to the pelvic brim, anteriorly to the lower portion of the pubes, posteriorly to the ischial spine and between the latter two points to the arcus tendineus; posteriorly it is continuous with the fascial covering of the pyriformis muscle.

Recto-vesical Fascia, at the arcus tendineus the superior pelvic fascia divides into two layers, one the recto-vesical fascia which covers the upper surface of the levator ani muscle and the other covers the obturator muscle. From the recto-vesical fascia a sheath is projected downward over the vagina and another over the rectum.

Levator Ani. A hammock-shaped muscle, the most important muscle of the pelvic floor. Made up of three fan-shaped fasciculi on each side.

1. Sciatic fan. Point at ischial spine; base at the side of the coccyx (usually described as the coccygeus muscle).

2. Coccygeal fan. Point at tip of the coccyx; base, a line on the fascia extending from the ischial spine to the pubes (arcus tendineus).

3. Pubic fan. Point at the pubes; base at the lateral portion of the vagina and rectum, and a line from anus to coccyx in which the fibers interlace with those from the opposite side.

Below the levator ani is the perineal fascia. Its posterior portion (back of the bis-ischial line) is attached to the sides of the pelvis, and the arcus tendineus from which it is reflected over the under surface of the levator ani, and its anterior part (in front of the bis-ischial line) is divided into three layers—the deep, the middle and the superficial perineal fascia. The deep layer covers the anterior portion of the lower surface of the levator ani. Between the other two fascial layers are the transversus perinei, the bulbo-cavernosus and the ischio-cavernosus muscles.

The Transversus Perinei. Origin, the ischial tuberosity; insertion, the perineal body.

The Bulbo-Cavernosus. Origin, the anal sphincter and perineal fascia at the right and left of it; insertion, by two slips, one into a tendon above, the other into a tendon below the clitoris.

The Ischio-Cavernosus. Origin, the ischial tuberosity and ischio-pubic ramus; insertion, the crus clitoridis, and an aponeurosis overlying the posterior portion of the body of the clitoris.

The Sphincter Ani lies in the plane of the three muscles just described. It is made up of two semi-circular bands, one on each side of the anus. Origin, the tip of the coccyx and adjacent skin; insertion, the tendinous center of the perineal body.

The Perineal Body is the mass of elastic and muscular tissue between the lower end of the vagina and the rectum. Height, one and a half inch. Transverse width, one and a half inch. Length of base, antero-posteriorly, one and a quarter inch, in the nullipara.

THE PARTURIENT AXIS.

Axis of the Inlet. A line perpendicular to the plane of the brim at its central point; its prolongation cuts the umbilicus and the tip of the coccyx.

Continuous with the axis of the uterus at term.

Axis of the Outlet. The perpendicular to the plane of the outlet at its middle point, cutting, if prolonged, a point in front of the sacral promontory.

Axis of the Outlet of the Soft Parts: Axis of expulsion—looks almost directly forward.

Axis of the Parturient Canal is an irregular parabola.

III. Passenger.

A factor in the labor by reason of its *shape*, especially of the head, *size*, especially of the head, *presentation*, *position*, *posture*.

OBSTETRIC ANATOMY OF THE FŒTAL HEAD.

The Cranial Vault is plastic, owing to the semi-cartilaginous character and mobility of its bones.

The Cranial Base and Face are firm and unyielding, since the bones of this region are more highly ossified and more firmly united.

Bones of the Cranial Vault.—1 occipital, 2 parietal, 2 frontal, 2 temporal.

Sutures.—The membranous intervals between two adjacent bones.

The Sagittal is the inter-parietal suture ;

The Frontal is the inter-frontal suture ;

The Coronal is the fronto-parietal suture ;

The Lambdoidal is the occipito-parietal suture.

Fontanelles.—The membranous space between the angles of three or four adjacent bones.

Anterior, or Large Fontanelle, or Bregma. At the anterior extremity of the sagittal suture ;

Kite-shaped or quadrangular, most acute angle forward ;

Average diameter, one inch ;

Four lines of sutures run into it.

Posterior Fontanelle. At the posterior extremity of the sagittal suture ;

Triangular ;

Small, usually a mere depression barely perceptible to the finger tip ;

Three lines of sutures run into it ;

Behind it the squamous or triangular portion of the occipital bone is movable upon the basilar portion by a hinge-like joint of fibrous tissue.

Protuberances.—*Occipital:* one inch or more behind the posterior fontanelle ;

Parietal eminence or bos—at the center of each parietal bone ;

Frontal—at the center of each frontal bone.

Vertex.—That portion of the head lying between the fontanelles and extending laterally to the parietal eminences.

Occiput.—That portion of the head lying behind the posterior fontanelle.

Sinciput.—That portion of the head lying in front of the bregma.

AVERAGE MEASUREMENTS OF THE FŒTAL HEAD.

Biparietal Diameter. Through the parietal eminences, three and a half inches.

Fronto-mental Diameter. From the summit of the forehead to the center of the lower margin of the chin, three and a half inches.

Occipito-frontal Diameter. From the tip of the occipital protuberance to the root of the nose, four and a half inches.

Occipito-mental Diameter. From the tip of the occipital protuberance to the center of the lower margin of the chin, five and a half inches.

Suboccipito-bregmatic Diameter. From the junction of the nucha and occiput to the center of the bregma, three and three-quarter inches.

Bitemporal Diameter. Between the lower extremities of the coronal suture, three and one-eighth inches.

Bimastoid Diameter. Between the mastoid apophyses, two and three-quarter inches.

Circumference. Suboccipito-bregmatic circumference, about thirteen inches. In male, one-half an inch greater than in female heads.

Trunk Diameters.—Bis-acromial, four and three-quarter inches; Bis-trochanteric, three and a half inches.

The trunk diameters are much more compressible than the cephalic.

Presentation.—Definition. Relation of the long axis of the foetal ovoid to the uterine axis.

Varieties. (1). *Longitudinal*;

(a). Cephalic—including:

- a. Vertex;
- b. Face;
- c. Brow.

(b). Pelvic—including:

- Breech;
- Feet.

(2). *Transverse*, including:

- Shoulder;
- Arm;
- Other rarer presentations.

Relative Frequency—at term. Cephalic, ninety-six per cent. (Face and brow a little more than five per cent.)

Pelvic, three per cent.

Lateral, one per cent.

The preponderance of cephalic presentation is due to adaptation.

Presenting Part. The part of the foetal ovoid which presents to the examining finger.

Position.—Definition. Relation of the presenting part to certain anatomical landmarks at the pelvic brim.

Vertex Positions. Left occipito-anterior—L. O. A. ;

Right occipito-anterior—R. O. A. ;

Right occipito-posterior—R. O. P. ;

Left occipito-posterior—L. O. P.

Relative Frequency: 70, 10, 17 and 3 per cent. respectively.

Face Positions. Left mento-anterior—L. M. A. ;

Right mento-anterior—R. M. A. ;

Right mento-posterior—R. M. P. ;

Left mento-posterior—L. M. P.

Breech Positions. Left sacro-anterior—L. S. A. ;

Right sacro-anterior—R. S. A. ;

Right sacro-posterior—R. S. P. ;

Left sacro-posterior—L. S. P.

Transverse or Shoulder Positions. Left scapula-anterior — L. Sc. A. ;

Left scapula-posterior—L. Sc. P. ;

Right scapula-posterior—R. Sc. P. ;

Right scapula-anterior—R. Sc. A.

Terms right and left refer to the mother.

Posture.—Definition. Relation of the foetal members to one another.

The normal posture is one of flexion.

In Cephalic Presentation. Extreme flexion of the head is the most favorable posture, since the head thus engages by its smallest diameters. Face and brow presentations are faults of posture.

In Breech Presentation. By variations of posture, either breech, knee or foot may be the presenting part.

In Shoulder Presentation. Either shoulder, elbow or hand may be the presenting part, according to posture.

NORMAL LABOR.

Definition. One in which the mechanical factors are all normal and there is no complication.

Mechanism of Cephalic Births.

Movements of the Head.—1. *Descent.* Driving force is the action of the uterine and abdominal muscles.

2. *Flexion.* Cause: (a.) Before engagement in the utero-cervical canal, primary flexion, the usual posture of the child *in utero*.

(b.) After engagement, unequal lengths of the frontal and occipital poles of the head; the frontal pole corresponding to the long arm of a lever.

Accommodation is still further promoted by moulding of the head.

Advantage of Flexion. It substitutes a maximum diameter of three and three-quarter inches for one of four and one-half inches.

3. *Rotation.* Cause, the slope of the lateral halves of the pelvic floor, downward, forward, inward.

That pole of the foetal head which first lands upon one lateral half of the pelvic floor glides downward, forward and inward under the pubic arch.

Complete flexion and moulding favor rotation by increasing the dip of the occipital pole.

Necessity for rotation, conformity to shape of the pelvic canal—the oblique being the longest diameter at the inlet, the antero-posterior at the outlet.

Normally occipito-posterior positions are converted into anterior positions by rotation. Rotation, however, may fail. Prior to rotation progress is somewhat hindered by the difficulty of adaptation.

4. *Extension.* Cause, adaptation.

5. *Restitution.* Cause, torsion of neck—untwisting.

Birth of the Trunk. Shoulders and breech rotate in similar manner to the head, but less perfectly and in opposite direction, since they come down in the opposite oblique diameter of the pelvis.

Obliquitiës of the Head.

Roederer's Obliquity. Flexion of the head.

Solayres' Obliquity. Engagement of the head in an oblique diameter of the pelvic brim.

Naegle's Obliquity. Inclination of the head at the brim toward the posterior shoulder. Occurs in the minority of cases.

Location of Caput Succedaneum.

L. O. A. The right posterior parietal region.

R. O. A. The left posterior parietal region.

R. O. P. The left anterior parietal region.

L. O. P. The right anterior parietal region.

Location may be modified by long continued pressure in the lower portion of the birth canal.

PHYSIOLOGICAL PHENOMENA.

Cause of Onset of Labor. Loosening attachment of the ovum ;

Distention of the uterus ;

Development of the contractile power ;

More vigorous movements of the foetus ;

Excess of $C O_2$ in the placental blood ;

Gaping cervix.

Premonitory Sign of Labor, lightening, sinking of the uterus downward and forward ; occurs generally within ten days of labor ; not constant.

Phenomena of Beginning Labor.—Irritability of the bladder and rectum ;

Show—not constant ;

Expulsion of mucous plug ;

Rhythmical uterine pains. At first pelvic tenesmus and lumbo-sacral pains. Later, pains felt toward the pubic region also, and radiating down the thighs. The uterus hardens with each pain.

Stages of Labor.—1. *Stage of Dilatation* : Ends with the complete canalization of the utero-cervical zone.

2. *Stage of Expulsion*. Ends with the birth of the child.

3. *Placental Stage*. Ends with the complete evacuation and permanent retraction of the uterus.

I. STAGE OF DILATATION.

Dilatation of the cervix is accomplished by the traction of the longitudinal muscular fibers of the upper uterine segment, and the hydrostatic pressure of the bag of waters.

By the traction of the longitudinal fibers of the uterus the lower uterine segment is pulled upward over the lower segment of the ovum.

The vessels of the cervix, unsupported by pressure, become engorged, and the cervical tissues loosened by serous infiltration. This favors dilatation of the cervical canal.

The internal os is at first obliterated with each pain, and restored in the intervals.

Subsequently permanent obliteration of the os internum is established, the ovum resting against the os externum.

From this time the progress of canalization is marked by the expansion of the external os.

Retraction Ring.—During the first stage the upper uterine segment becomes thickened by retraction of the muscular structures into that segment, and the lower segment correspondingly thinned. The line of demarcation between the thickened upper and the thinned lower segment is the *retraction ring*. The situation of the retraction ring is above the brim by the end of the first stage.

The Bag of Waters.—With membranes unbroken, the ovum is peeled off from the lower uterine segment and protruded as dilatation progresses. This protruding portion of the membranes forms the bag of waters. In vertex presentation it has a watch-glass shape.

The contained liquor amnii is the *fore-waters* in distinction from that above the head, termed the *hind-waters*.

The protruding bag of membranes acts in some measure as a dilating fluid wedge.

The dilatation of the cervix is usually slower and more painful when the membranes rupture prematurely. The bag of waters is a better dilator than the presenting pole of the foetus, for the reason that the hydrostatic pressure acts laterally as well as longitudinally and is equally distributed over all parts of the resisting ring. Malpresentations and malpositions are especially unfavorable to normal dilatation, owing to the still greater inequality of pressure upon different parts of the resisting girdle.

Rupture of the Membranes.—The bag of membranes ruptures usually by the time it reaches the pelvic floor; frequently sooner or only on interference.

Retraction of the Pubic Segment.—The bladder and the whole pubic segment of the pelvic floor begin to be drawn upward during the latter part of the stage of dilatation.

Pains : Labor Pains.—*Definition.* The painful uterine contractions of labor.

Cause of the pain, pressure on the nerve filaments of the uterus.

Duration of contraction, thirty to sixty seconds.

Intervals, at the beginning of labor about thirty minutes, gradually shortening as labor progresses ; may be reduced to a fraction of a minute at the close of the second stage.

The intensity progressively increases. Rarely the first stage is painless. Frequently the first stage pains are not as well borne as those of the second stage.

Duration of the first stage, two or three hours to several days ; average, in primiparæ, fifteen hours ; in multiparæ, eleven hours.

II. STAGE OF EXPULSION.

The driving force is the action of the uterine and abdominal muscles.

Membranes unbroken, the expelling forces act to extrude the entire ovum.

Membranes broken and fœtus consolidated, the expelling forces act to extrude the fœtal ovoid.

Lubrication of the passages is accomplished by the increased secretions and by the liquor amnii.

The intensity of the pains is augmented by the pressure of the presenting pole upon the vaginal walls, and reaches its acme at the vulvar outlet, at the perineal stage of labor.

Pains of the expulsion stage are distinguished by their bearing-down character.

An œdematous tumor is developed upon the presenting part of the foetal head as it engages in the cervix after the rupture of the membranes which is known as

The Caput Succedaneum. The development of the caput succedaneum is due to the absence of pressure over the presenting part. The vessels of the presenting part become engorged during the uterine contractions and serous infiltration of its tissues results.

Moulding. The head becomes elongated in the direction of the birth-canal with a corresponding reduction of its engaging diameters.

Advance and Recession of the Head. The head advances with the pains and recedes in the intervals.

Perineal Stage. The sacral segment of the pelvic floor is relaxed,

elongated, and thrust downward and backward in front of the advancing head.

The anal orifice is dilated owing to the relaxation of its sphincter.

The length of the sacral segment (from the coccyx to the posterior commissure) is increased to five or six and one-fourth inches at the moment of expulsion.

The occiput escapes under the pubic arch, the nape of the neck rests against the sub-pubic ligament, the head is extended, rotating about the nucha as a pivotal point, and the vertex, the forehead and the face successively sweep over the perineum. A short pause generally follows the birth of the head.

A gush of bloody water usually attends the expulsion of the trunk.

The maternal pulse-rate is somewhat increased during the pains.

The maternal temperature, particularly in hard labor, is usually a fraction of a degree or more above the normal at the close of labor.

The fetal pulse-rate is retarded at the acme of the pains owing, probably, to increased arterial tension in the foetus.

Duration of the Second Stage. Primiparæ, one to seven hours : average, two hours. Multiparæ, fifteen minutes to two hours ; average, one hour.

III. PLACENTAL STAGE.

Events.—1. *Separation of the Placenta* is accomplished by contraction of the placental site and by the extruding force of the uterine contractions. Separation takes place in the meshy layer of the decidua.

2. *Expulsion of the Placenta* is due to the extruding force of the uterine contractions. The after-birth presents by its amniotic surface or is expelled edgewise. The membranes are gradually detached from the uterus as the placenta is expelled.

3. *Retraction of the Uterus* consists in a rearrangement of its muscular fibers, by which the walls are thickened and shortened. Normally retraction of the upper segment becomes complete at the close of labor. Retraction securely ligates the uterine vessels torn across on separation of the placenta. The lower segment remains passive for several hours after the birth of the child.

Duration of the Third Stage, ten minutes to two and a half hours; usually twenty to thirty minutes.

After-Pains are painful contractions of the uterus after labor.

Average Length of Normal Labor.—In primiparæ, seventeen hours, in multiparæ, twelve hours.

MANAGEMENT OF NORMAL LABOR.

PREPARATORY.

The patient should be under the observation of her physician during at least the latter months of pregnancy; should consult him on the slightest departure from health. The obstetrician should be advised early of the number and character of previous pregnancies and labors, if any have occurred.

Hygienic rules should be strictly enforced.

The Nipples should be cleansed daily during the last month or more with a weak borax solution (borax ʒss, water Oj), and, especially if sunken, should be anointed with cocoa butter or vaseline and gently drawn with the fingers.

The Urine should be examined for albumen once weekly during the last two months, earlier and oftener for cause. Specific gravity and microscopic examination for casts afford important information with reference to the possible presence of a chronic nephritis. A physiological glycosuria is common in the latter months.

Preliminary Examination, A Month Before Labor.

Abdominal.—*Examine for :*

- Pendulous abdomen;
- Hydramnion;
- Twins;
- Placenta prævia;
- Hydrocephalus;
- Complicating tumors;
- Presentation;
- Position;
- Posture.

Fœtal heart. (Rate below one hundred or above one hundred

and sixty, an indication of danger to the foetus. Persistent absence is evidence of foetal death.)

In primiparæ, measure the external diameters of the pelvis.

Method of Examination for Presentation and Position.

1. *Preparation.* Patient in dorsal decubitus, abdomen fully exposed. Hands of operator bathed in warm water to render the sense of touch more acute, and to help prevent reflex uterine contractions. The pressure of the hands need never be heavy enough to cause discomfort, except sometimes in searching the excavation.

2. *Locate Dorsal Plane and Small Parts,* examining hand on the abdomen over the uterus. Downward pressure on the breech steadies the dorsum and brings it nearer to the examining hand. Identify the dorsum by the length and breadth of the resisting plane. Distinguish from the lateral plane by its greater width and by the absence of a sulcus between it and the head. Small parts are felt as nodules which glide about under the touch; their outlines may sometimes be fully traced.

3. *Search the Lower Uterine Segment.* Both hands over the lower uterine segment and well apart, finger tips toward the mother's feet; catch the lower pole between the hands.

Head is hard and globular; presents a lateral sulcus between it and the trunk; in primiparæ (not in multiparæ) it lies in the pelvic excavation before labor; cephalic prominence greatest on the side of the sinciput.

Breech is, alone, smaller, with all its component elements larger, than the head; lacks the hard and globular character of the head. presents no sulcus, and always lies above the excavation before labor.

Either pole in one iliac fossa indicates a cross-birth.

4. *Search the Upper Uterine Segment.* Both hands over the upper segment and well apart, finger tips toward the mother's face: differentiate foetal poles by the signs already given and by ballottement of the head. The breech lacks the flexible attachment to the trunk which characterizes the head, and has less mobility by reason of this and the greater bulk of its component parts.

5. *Locate the Anterior Shoulder.* Place the hands on the sides of the foetal head, and, without relaxing the pressure, move them toward the breech. The point at which they first encounter an obstacle is

the anterior shoulder. Identify it, if possible, by its anatomical characters.

Anterior shoulder within one or two inches of the median line indicates an anterior position of the foetal dorsum; several inches from the median line indicates a posterior position of the dorsum.'

6. *Locate the Foetal Heart.* The point at which it is heard loudest indicates nearly the position of the lower angle of the left scapula of the foetus. Foetal heart in upper uterine segment suggests a breech, in the lower, a cephalic presentation.

Vaginal.—Antiseptic precautions as in examination during labor. *Examine for:*

- Old injuries;
- Pelvis ample, contracted or obstructed;
- Placenta prævia;
- Presentation and position.

The Lying-in Room should be a large room with sanitary plumbing or none at all, preferably with a southern exposure, and well ventilated. An open fire is a good ventilator.

The room, the bedding and the clothing of the patient should be surgically clean.

Preparation of the Bed.—*Directions for the Nurse.* Cover the mattress with a muslin sheet, and that with a rubber sheet large enough to reach across the bed. Spread a clean muslin sheet over the rubber and pin fast to the mattress. Spread over that a second rubber covered with a muslin sheet. Place two or three fresh laundered sheets, twice folded, in position to receive and absorb the discharges.

Labor Pad. Instead of the folded sheets an aseptic pad of prepared jute or other absorbent material covered with cheese-cloth may be used to receive the discharges. Should be two and a half to three feet square. A Kelly rubber pad is a convenient substitute for the absorbent pad.

Obstetric Armamentarium.—Obstetric Forceps, Soft Rubber Catheter, Hypodermic Syringe, Fountain Syringe, Uterine Douche-Tube of Glass, Needles. Needle-Forceps, Aseptic Sutures, Hand Brushes, Sims' Speculum, Sponge - Holding Forceps, Volsella, Curette, a yard of Aseptic Gauze.

Squibb's Chloroform, Chloral, Squibb's Ergot, Morphia tablets, gr. $\frac{1}{8}$, Ext. Veratri Viridis fl., Antiseptic tablets of the biniodide or bichloride of mercury, or powders as follows:

℞ Hydrarg. biniodid.
Potass. iodid. āā 3j.
℥. Cht. No. viii.

S. One to a quart of warm water, as an antiseptic solution.

℞ Hydrarg. bichlorid.
Ammon. chlorid. āā 3j.
Acid. tart. 3 v.
℥. Cht. No. viii.

S. One to a quart of warm water, as an antiseptic solution.

The Nurse Should Have Ready :

A dozen clean sheets ;

A dozen towels recently laundered ;

A dozen pieces of cheese-cloth, about eighteen inches square, for wash-cloths :

Two or three pieces of straight unbleached muslin for binders, a yard and a quarter long by half a yard wide ;

Two surgically clean rubber sheets, large enough to reach across the bed ; table oilcloth may be substituted where economy requires ;

Scissors ;

Two dozen shield-pins of medium size ;

A bed-pan of earthenware or agate ironware ;

Plenty of hot and cold water ;

Two or three clean hand-basins of earthenware or agate ironware ;

A slop jar ;

Two new hand-brushes ;

A yard of strong linen bobbin, one-sixteenth of an inch wide, for tying the navel cord ;

A woolen blanket for wrapping the child ;

A child's bath-tub and a bath thermometer ;

Castile soap ;

An ounce package of salicylated cotton for dressing the child's navel ;

The child's clothing.

ANTISEPSIS.

Antiseptic Agents.

Dry heat at 240° to 260° F. (Baking in an oven, ten minutes for instruments; one hour for dressings.)

Boiling or Steaming for ten minutes. Boiling is best done in water containing one and a half per cent. of common washing-soda. This removes greasy matter and prevents metallic instruments from rusting.

Chemical Disinfectants:

Mercuric Iodide Solution, 1:2000.

℞ Hydrarg. biniodid.
Potass. iodid. āā gr. viiss.
Aq. Oij.
M.

Mercuric Chloride (sublimate) Solution, 1:2000.

℞ Hydrarg. bichlorid.
Ammon. chlorid. āā gr. viiss.
Acid. tart. gr. xl.
Aq. Oij.
M.

Chlorinated Soda Solution, 1:10.

℞ Liq. sod. chlorinat. ℥j.
Aq. ℥ix.
M.

Creolin Solution, 1:100.

℞ Creolin ℥iiss.
Aq. Oij.
M.

Non-Metallic Utensils may be disinfected with any of these agents; heat is the most effective.

Cloths, Linen, etc., with any except chlorinated soda, which destroys the fabric. Steaming or boiling is best.

Metallic Instruments, by dry or moist heat.

The Obstetrician should use a clean apron to cover his clothing and to protect his hands and arms against contact therewith.

Technique of Hand Cleaning. 1. Clean the nails dry.

2. Scrub the hands and fore-arms thoroughly with soap and hot water and a hand-brush for not less than three minutes.

Hand-brushes should be sterilized by steaming for ten minutes or by boiling in water for the same length of time. The addition of one and a half per cent. of washing-soda to the water ensures the removal of fatty matter and makes the cleansing more effective.

3. Rinse off the soap with clean water.

4. Scrub with one of the mercurial solutions (1 : 2000), and another hand-brush for several minutes.

Give special attention to the finger tips, particularly the free edges of the nails, in both scrubblings.

5. As an extra precaution wet the hands well with ninety-five per cent. alcohol.

6. Finally, hold them for several minutes in the antiseptic solution.

Permanganate Method. Steps 1, 2 and 3, as above.

4. Immerse for two minutes in a warm saturated solution of permanganate of potassium in boiled distilled water.

5. Remove the permanganate stain by immersion in a warm saturated solution of oxalic acid, made with boiled water.

6. Wash with sterilized water.

7. Immerse for two minutes in a mercuric iodide or chloride solution, 1 : 500.

By this method the hands may be rendered sterile to culture tests.

Use as a lubricant for the hands either the sterilizing solution, or a 1 in 1000 solution of mercuric iodide in glycerine. Keeping the hands wet with the biniodized glycerine keeps them soft and maintains continuous disinfection. To prevent reinfection of the hands, touch nothing that is not aseptic.

Dip the hands for a moment in the mercurial solution before each subsequent examination.

The Nurse should wear wash dresses recently laundered, and should cleanse her hands, as the doctor does, before touching the genitals of the lying-in patient.

The Patient, at the beginning of labor, should have a bath and an entire change of clothing.

Before the doctor's examination instruct the nurse to cleanse the external genitals, the thighs and abdomen of the patient with soap

and warm water; then to remove the soapy water, and bathe the parts with one of the mercurial solutions.

In case of foul secretions or gonorrhœal discharges the vagina and cervical canal should be cleansed in like manner with soap and water, using gentle friction with the fingers, and following with an antiseptic douche. The object is prophylaxis not only against infection of obstetric wounds of the passages, but also against ophthalmia in the child.

For vaginal use a suitable antiseptic is the chlorinated soda or creolin solution, or one of the mercurial solutions. The latter, however, should be immediately followed with a plain sterilized water douche to wash out the mercurial as a precaution against mercurial poisoning.

EXAMINATION OF PATIENT DURING LABOR.

1. Verbal.—*Precursory Signs :*

Lightening ;

Irritability of the bladder and rectum .

Signs of Actual Labor :

Irritability of the bladder and rectum :

Expulsion of mucous plug ;

Bloody discharge—the show ;

Rhythmical pains in the lumbo-sacral and lower abdominal regions.

Note frequency and strength of the pains.

2. Abdominal.—As in the preliminary examination and note especially

Presentation ;

Position ;

Posture ;

Fœtal pulse-rate ;

Bladder, full or empty.

3. Pelvic.—*Note in Order* the condition of the vulva—old injuries, rigidity, œdema ?

Vagina—well lubricated ? old injuries ?

Rectum and bladder—full or empty ?

Bony pelvis—all diameters, especially diagonal conjugate : shape, inclination ;

Cervix—old injuries ? dilatable ? how much dilated ?

Membranes—ruptured or not? watch-glass or glove-finger protrusion? Also

Presentation—examine all accessible fetal parts, with firm pressure, taking plenty of time, and using one, or, if possible, two fingers:

Position;

Posture;

Stage of progress.

Diagnosticate Vertex Presentation by the hard and globular character of the foetal head, and by the sutures and fontanelles: position, by locating the sagittal suture and finding which end is forward;

Posture, by the relative descent of the fontanelles:

Stage of Progress, in the first stage, by the degree of expansion of the cervix, in the second, by comparing the situation of the leading pole, occiput, with the landmarks of the birth-canal.

Statement of prognosis must generally be more or less guarded: should be made as definite as the facts permit.

MANAGEMENT OF THE STAGE OF DILATATION.

For Relief of Severe Pains.—Chloral, 1 drachm, in doses of gr. xx every fifteen minutes.

Opium, rarely, gr. 1, or equivalent dose of morphia or codeia;

Chloroform, very rarely, in the latter part of the first stage.

Frequency of Vaginal Examination.—Should be as infrequent as practicable (one to four hours); may in many cases be omitted altogether.

Instructions.—Direct the patient not to keep the bed, not to bear down with the pains, and to keep the bladder and rectum empty. The lower bowel should in all cases be cleared during the first stage by an enema of warm water.

Practical Hints.—Prescribe the diet.

Except in very slow labor, remain with patient after the os externum reaches the size of a silver dollar.

Never hurry the first stage, except when necessary to avert positive danger to mother or child.

Note the foetal and the maternal pulse-rate from time to time.

MANAGEMENT OF EXPULSION STAGE.

Taking the Bed.—The patient should take the bed at the beginning of the second stage. Sooner in case of severe pains.

Should be dressed for the bed with her linen tucked under the arms and pinned, and with a folded sheet fastened above the hips in the manner of a skirt.

Rupture of the Membranes.—The bag of membranes may be ruptured when it reaches the pelvic floor; earlier in the second stage in case its persistence retards the labor, causes hemorrhage by separation of the placenta or otherwise threatens danger to mother or child.

Method. Rupture with the finger-nail, or puncture with a stout hairpin previously flamed, or with clean, sharp-pointed scissors.

Puller.—Except in over-rapid labor the patient may be allowed, during the pains, to pull upon a sheet twisted into a rope and fastened by one end at the foot of the bed.

Obstetric Positions.—In general, consult the convenience of the patient.

For examinations, prefer the dorsal.

During the "perineal stage," the preferred position, at least for the primipara, is the lateral.

Frequency of Vaginal Examination.—As infrequent as will permit a proper knowledge of the progress of labor—one-half to one hour; in many cases may be wholly omitted.

Anæsthesia.—Chloroform, plain or amyliized (amyl. nitrit. 5ss to chloroform Oj), the preferred anæsthetic in natural labor.

May be used in, practically, all cases for a part or all of the second stage during the pains only.

Quantity of chloroform, five to twenty drops at the beginning of each pain—not enough to abolish consciousness, except at the perineal stage; then nearly or quite to the surgical degree.

Method. Head low and clothing loose.

Examine the heart.

Remove false teeth.

Smear the nose and lips with vaseline or glycerine.

Inhaler, a towel spread over the head and lifted at its middle several inches from the face.

Drop the chloroform on the upper side of the towel. Direct the patient to take several deep inspirations at the beginning of a pain.

Remove the towel in the intervals between the pains.

Give freely at the moment of expulsion.

Protection of the Cervix.—Avoid much manipulation of the cervix. It invites sepsis.

Regulate the expelling forces in over-rapid labor to prevent tears. This may be done by regulating the abdominal pressure and by the use of chloroform.

Chloroform may accelerate, retard or arrest expulsion according to the freedom of dosage.

Protection of the Perineum.—Retard the expulsion of the head for a half hour or more, keeping the pelvic floor continuously on the stretch by preventing the recession of the head in the intervals between the pains. Retard by holding the head back, with the fingers against the occiput, by moderating the driving forces by use of chloroform and by regulating the abdominal pressure.

Deliver the head by its smallest circumference. Regulate extension.

Press the head well up in the subpubic arch as the forehead is about to escape.

Preliminary relaxation of the pelvic floor by the finger is permissible, steadily pressing the sacral segment backward with one or two fingers in the introitus.

Episiotomy.—When extensive laceration is otherwise inevitable, incise the resisting ring at the vulvar outlet, bilaterally.

Cut during a pain.

Pass a narrow blunt-pointed bistoury flatwise between the head and the resisting girdle. Turn the edge outward and cut horizontally, holding the knife in line with the axis of the patient's body. Avoid the skin.

Location of incisions, one inch from the median line on each side, posteriorly, when the parts are fully stretched.

Length of incision, one inch.

Depth of incision, one-quarter inch.

Suture the incisions after labor.

Management of the Cord.—If wound about the neck, slip it down over the head. If this is impracticable cut it and deliver the trunk promptly.

Delivery of the Trunk.—Lift the head well up toward the mother's abdomen and deliver the posterior shoulder first by lifting it over the perineum. Disengage the posterior arm and release the anterior shoulder. Extract the trunk slowly or leave to nature.

Ligation of the Cord.—In general, wait till notable pulsation ceases at a point near the vulva.

Tie firmly with aseptic narrow linen bobbin an inch from the umbilicus.

Place a second ligature a few inches farther away.

Cut between the ligatures, near the first, with clean scissors. Press the end of the stump with a cheese cloth, dipped in the mercurial solution, to see if it bleeds; if it does, tie again.

Thick cords should be stripped, before tying, by firm pressure without traction at the point to be ligated.

MANAGEMENT OF THE PLACENTAL STAGE.

From the moment the head is born, keep the hand on the abdomen over the anterior surface of the uterus till evacuation and retraction are complete.

Use gentle friction, when necessary, to provoke normal contractions.

Delivery of the Placenta.—*Credé's Method.* After three or four pains supplement the contraction, at the acme only, by manual compression, through the abdominal wall, the hand grasping the fundus, thumb in front, fingers behind.

Repeat this manipulation with each pain.

Don't pull the cord to assist delivery till the placenta lies partly in the lower uterine segment or vagina.

Manual Extraction. Credé failing, after an hour, deliver by hand in vagina, seizing the placenta with the fingers passed through the cervix.

Management of the Membranes. On expulsion of the placenta twist the membranes into a rope till detached.

Examine the Placenta and Membranes to make sure they are complete.

REPAIR OF LACERATIONS AFTER LABOR.

Cervical Lacerations should be immediately sutured only in case they give rise to troublesome hemorrhage.

Method. No anæsthetic is required.

Place the patient in the Sims' position on the bed or a table. Expose the cervix with a large Sims' speculum.

Draw the cervix well down with a volsella. The traction usually arrests the hemorrhage for the time.

Bring the surfaces of the cervical wound together, and hold them by means of the volsella hooked in the opposite lips.

Suture with silk, passing the first suture above the angle of the tear.

Vaginal Lacerations should be sutured after labor.

Lacerations of the Pelvic Floor.—*Frequency.* In primiparæ, fifteen to thirty-five per cent.

In multiparæ, ten per cent.

Causes. Narrow pubic arch ;

Small size, relatively, of the vulvo-vaginal orifice ;

Undue rigidity of the pelvic floor structures ;

Advanced age in primiparæ, over thirty years ;

Faulty mechanism ;

Over-rapid delivery ;

Unskilled use of forceps.

Degrees. First, to the central tendon of the perineal body.

Second, to the sphincter ani.

Third, to or into the rectum.

Treatment. Time for Repair. Notable lacerations at the vaginal orifice should, as a rule, be immediately sutured. Union, however, may be obtained by suturing within the first twenty-four hours. The suture may be successfully done any time within a week or more, if the wound surface is first vivified by rubbing with a fold of cheese-cloth. Suturing before delivery of the placenta saves the necessity for renewed anæsthesia.

Suture Material. For ordinary sutures, sterilized waxed silk, size of Corticelli sewing-silk, F. For buried sutures, sterilized cat-gut.

Needle. A straight or slightly curved Hagedorn or other surgical needle about two inches long. A common darning-needle will answer in the absence of a better. May be held in the fingers, or a suitable needle-holder.

Anæsthesia is usually necessary. Chloroform is generally safe for the purpose, if properly managed.

Slight tears may sometimes be sutured under cocaine anæsthesia. The cocaine solution should be sterilized by boiling. Cocaine is most effective when injected at several points into the lips of the wound. Not more than a grain should be used in this manner.

Operation. Lithotomy position. Hips at the edge of the bed or table, knees held by assistants, or by Dickinson's sheet-sling, as follows: Taking a sheet by diagonally opposite corners, twist it loosely into a rope; with the patient in the desired position, pass the sheet-sling under both popliteal spaces; carry one end over her shoulder and across the back of the neck; pull taut and tie the ends together in front of the chest.

Examine well the character and extent of the injury.

The suture should re-establish the normal relations of the parts.

Place the sutures at half-inch intervals, beginning at the posterior angle of the wound, nearest the rectum.

Enter the needle on the skin surface close to the edge of the wound; sweep it deeply through one lip; bring it out just short of the bottom of the wound, and pass it symmetrically through the other lip from within outward. The course of the suture should be such that when tied the loop shall be nearly circular. Knot the opposite ends of the suture together or hold with catch-forceps.

Sutures all placed, tie them tight enough only to coapt the wound surfaces. Cut the ends an inch in length, to facilitate removal.

In case of torn sphincter ani, bring the ends of the muscle together with two or three special sutures.

Tears extending up either vaginal sulcus should be sutured on the vaginal surface to within an inch or less of the skin. The perineal sutures may then be applied in the usual manner.

After-Care. It is not necessary to tie the knees together.

The use of the catheter is generally required for a time at least after the perineal suture. It should be avoided if possible.

The bowels should be opened on the third day, and kept open daily thereafter.

CARE OF THE PATIENT AT THE CLOSE OF LABOR.

Retraction of the Uterus. Watch the uterus for a half hour or more after the delivery of the placenta, holding the hand flat upon the abdomen over the anterior surface of the uterus. Use gentle

friction, if necessary, to promote contraction. A half drachm of the fluid extract of ergot may be given by the mouth or injected subcutaneously if the uterus does not contract firmly.

Cleansing. Direct the nurse to bathe, with the mercuric iodide or chloride solution, the external genitals and soiled parts of the patient's body, and to change her linen and bed linen if soiled. Fresh boiled cheese-cloths, not sponges, should be used for bathing.

Vulvar Dressing. The external genitals may be covered, after cleansing, with a folded napkin, the *lochial guard*. The dressing must be aseptic, better for the first five days antiseptic. The lochial guards may be made aseptic by boiling for a half hour; antiseptic by dipping them, after boiling, in the mercuric iodide solution. Should be dried before using.

A good substitute for the napkin as a vulvar dressing may be made of prepared jute or other absorbent material, loosely packed and enveloped in cheese-cloth. The absorbent portion, or pad, should be ten inches long, four inches wide, and one and a half inch thick. A tail about ten inches long should be left at each end of the pad for pinning to the abdominal binder. Burn after using.

Draw Sheet. A sheet folded to four thicknesses may be placed under the patient's hips to protect the bed. Change as often as soiled.

The Abdominal Binder should be of unbleached muslin, a yard and a quarter long, half a yard in width and without gores. It should reach from the ensiform to a point just below the trochanters. May be moderately tight for the first twelve hours, subsequently looser.

The Condition of the Mother. including the pulse-rate, temperature, after-pains and amount of flow, should be noted before leaving.

Instructions to the Nurse. Instruct the nurse with reference to the general management of the patient, and especially in the matter of sleep, diet, evacuations of the bladder, nursing the child; also to note the amount of the lochial flow. Leave a drachm of the fluid extract of ergot to be given in case of hemorrhage, a grain of opium or its equivalent for use if needed for severe after-pains, and a suitable antiseptic to be used in bathing the genitals.

PHYSIOLOGY OF THE PUERPERAL STATE.—THE CHILD.

CLINICAL COURSE AND PHENOMENA OF THE PUERPERIUM.

A post-partum rigor is common at the close of labor or during the third stage.

The pulse-rate is below the usual normal standard, forty to sixty-four.

Temperature, physiological upper limit, first four or five days, $99\frac{1}{2}^{\circ}$; later, 99° F.

Constipation is the rule.

Retention of urine (ischuria) is common from lowered intra-abdominal pressure and other causes.

Glycosuria, from resorption of lactose, is normal for the first few days.

Peptonuria may be noted for several days, peptone being a product of uterine involution.

Condition of the Uterus. The upper segment is thick and firmly retracted:

The lower segment is thin and flaccid for about twelve hours; thereafter, it gradually regains its shape and muscular tone.

The Cavity. Inner layer of the decidua remains to be gradually shed during the lochial flow.

Fragments of the outer, superficial, layer are also retained, to be detached and discharged with the lochia.

The placental site is prominent and studded with small blood clots lying in the mouths of the vessels.

Involution.—*Definition.* The retrograde changes by which the hypertrophied structures, especially of the uterus, are restored to the non-gravid condition normal to the healthy parous woman; is essentially a process of fatty degeneration, due to the diminished blood supply. The endometrium is completely renewed.

Uterine Involution.—*Rate of Progress.* *Size of the Uterus.* At the close of labor, four or five by seven or eight inches;

Walls, one to one and a half inch thick :

Depth of the cavity, about six inches.

After complete involution, the thickness, width and length are respectively one, two and three inches.

The parous uterus remains permanently larger than the virgin uterus.

Situation of the Fundus. Immediately after labor, midway between the umbilicus and the pubes. A few hours later, near the umbilicus, and the uterus, usually, dextroverted. Tenth day, at the level of the brim.

The elevation of the fundus, however, is modified by the fulness of the bladder and rectum.

Weight. Approximate weight at close of labor, thirty ounces ;

End first week, twenty ounces :

End second week, ten ounces :

End third week, five ounces ;

After involution, ten to thirteen drachms—one and a half ounce nearly.

Duration of Involution, six to eight weeks.

Involution of the uterus is retarded in non-nursing women, after twin births, premature labor, much hemorrhage, retention of secundines, or getting up too soon.

The Cervix is bell-shaped, below the retraction ring, and flaccid for twelve hours, and is two and three-fourths inches in length. The cervix is then gradually re-formed.

The os internum admits two fingers at the end of twenty-four hours.

The os externum admits one finger after seven to fourteen days.

Involution goes on *pari passu* with that of the upper segment of the uterus.

The lower border is permanently more or less notched in parous women.

The Vagina. The vaginal walls are hypertrophied and relaxed after labor.

Involution progresses with that of the uterus.

Restoration is not complete.

The Uterine Ligaments also undergo involution.

After-Pains. The periodical uterine contractions of pregnancy and labor continue for a few hours or days post-partum : frequently

they are more or less painful in multiparæ: usually not so in primiparæ; they accomplish and maintain the retraction of the uterus.

The Lochia. The genital discharge following labor.

Character. 1. More or less bloody for about four or five days—*lochia rubra*; containing shreds of decidua, membranes and placental tissue;

2. Then sero-sanguinolent—*lochia serosa*—for two or three days;

3. Finally creamy—*lochia alba*—and containing fat granules, epithelial cells, leucocytes and cholesterine.

Reaction alkaline for a week or more, then neutral or acid.

Amount, about three and a quarter pounds.

Duration, two to four weeks.

MANAGEMENT OF THE PUERPERAL STATE.

Frequency of Visits.—Once or twice daily for the first three days; once daily thereafter till the seventh: occasional visits during the balance of the month.

Observations at the First Visit.—Note the general condition of the mother, pulse, temperature. Have the binder loosened and examine the uterus, externally, for size, firmness, tenderness. Note in the abdominal examination whether the bladder is full or empty. Learn whether the bladder has been evacuated, and if the patient has had sufficient sleep and proper diet. Look to the child. Ascertain whether it has passed urine and meconium as evidence that the passages are pervious: whether there is any discharge from the eyes, or bleeding from the navel, and what its temperature is per rectum.

At Subsequent Visits.—Watch the pulse and temperature, the condition of the breasts and nipples, involution of the uterus, and general condition of the mother. Examine the pelvic contents by the bimanual, once or more during the third or fourth week. Note especially whether the introitus vaginæ is normally closed, the vagina intact, condition of the broad ligaments (exudations or adhesions), cervix lacerated or gaping, the size, shape, position, density and mobility of the uterus.

The case should not be wholly dismissed till involution is complete and the pelvic organs are restored to their normal non-gravid state. Note the condition of the child at each visit.

Evacuations of the Bladder.—The bladder should be emptied within six hours after labor, and once in six or eight hours subsequently.

Retention of Urine may sometimes be relieved by hot fomentations to the meatus; a rectal injection of warm water; supra-pubic pressure; a sitting or half-sitting posture during attempts at micturition.

Evacuations of the Bowels.—The bowels should be opened on the third day, once daily thereafter. Order for this purpose either a simple laxative, an enema of warm water, Oj, or a rectal injection of a saturated solution of Epsom salts, ʒi.-ii. , or of clear glycerine, ʒii.

After-Pains may be relieved, if severe, by one or two doses of opium, gr. $\frac{1}{2}$ to gr. i.

Tardy Involution of the Uterus.—Useful measures for promoting involution are: gentle friction, twice daily, hand on the abdomen; galvanism, ten to twenty milliamperes, one electrode over upper part of the sacrum, one upon the abdomen over the uterus, sitting ten minutes twice daily; Faradism in like manner; ext. ergot, gr. i., t. i. d.; hot vaginal douche, two or three gallons, temp. 115° F., once or twice daily.

Restorative Measures.—Rest and sleep, as generous a diet as the patient can digest, tonics and stimulants if indicated.

Antisepsis.—Rigid cleanliness of the patient's person, linen and bed-linen is imperative.

The Nurse should wear wash-dresses, frequently changed, and should be as careful in the observance of all antiseptic details as the doctor is required to be.

The Lochial Guards should be changed every three to six hours during the first three days, and at all times often enough to prevent the slightest putrefactive odor.

The external genitals and immediate surroundings should be cleansed with an antiseptic solution on changing the dressing. Permit no fetor. Vaginal or uterine douches should be used only for cause.

Diet.—Liquid or light solid food for the first day, especially if the patient be much exhausted, or has taken an anæsthetic; milk,

gruels, beef essence, animal broths, soft-cooked eggs, oysters, custard, oatmeal mush or wheaten grits, dry toast and weak tea or cocoa are suitable. Thereafter, in the absence of exhaustion, fever, indigestion, or loss of appetite, a moderately full diet as a rule.

Use of the Catheter.—Catarrh of the vesical neck after the use of the catheter is generally the result of infection carried on the instrument. Catheterism, therefore, should be avoided if possible, and when required should conform to the following rules:

Instrument. A soft rubber or a glass catheter. The catheter should be boiled for ten minutes immediately before using, and after sterilizing should be handled only with hands that have been antiseptically cleansed.

Posture of the Patient. On the back, with the knees drawn apart. Let the patient or an assistant retract the labia to fully expose the meatus urethræ, and hold them apart till the catheter is passed.

The Approaches. including the meatus and surrounding surfaces, should be carefully cleansed.

Pass the Catheter, lubricated with sterilized vaseline, about one and a half inch, or till the urine begins to flow.

Collect the urine in a cup or small bowl.

Repeat the evacuation of the bladder every eight hours.

Precautions. Prevent the entrance of urine into the vagina and its contact with genital wounds. Cleanse the instrument carefully after using.

DURATION OF THE LYING-IN.

Rules for General Guidance.

First Week. Patient should keep the bed.

Second Week. Should maintain a recumbent posture on the bed or lounge; may sit erect in bed for evacuation of bladder or bowels and during meals.

Third Week. May occupy an easy-chair all or a part of the day; must not walk or stand.

Fourth Week. May have the liberty of the room. At the end of a month may leave the room.

LACTATION AND NURSING.

The True Milk Secretion generally begins on the third day in primiparæ, the second in multiparæ.

Colostrum is the thin, somewhat viscid fluid furnished by the mammary glands of the puerpera before the true milk secretion is established. It contains fat globules and has moderate laxative properties.

Contra-Indications to Suckling the Infant. Among the conditions which prohibit nursing are recent syphilis, phthisis, extreme anæmia, epilepsy, poor quality or very deficient quantity of milk, pregnancy.

Signs of Deficient Lactation. Flabby breasts;
Child not satisfied and showing signs of inanition.
Examine the milk.
Weigh the child weekly.

Measures for Increasing the Secretion. Generous diet, milk, Faradism to the breasts, tonics and good hygiene.

Care of Breasts and Nipples. Excessive nursing should not be permitted. The nipple is injured by prolonged maceration.

Direct the Nurse to cleanse the nipples after each nursing with a saturated solution of boric or salicylic acid in water, to which one-eighth part of glycerine has been added. The child's mouth may be cleansed in like manner before nursing.

Gentle massage of the breasts is permissible in case of simple milk engorgement.

THE CHILD.

CONDITION AT BIRTH.

Weight. Seven to seven and a quarter pounds: males averaging more than females, first less than subsequent births.

Average Gain in Weight about one and a half pound per month for the first five months, and a pound per month for the remainder of the first year.

Measurements. Length, eighteen to twenty inches. For other measurements, see page 30.

Temperature, 98.6° to 99° F., but is easily affected by slight causes.

Circulation. The ductus arteriosus, ductus venosus, and the umbilical veins become obliterated in a few days, the foramen ovale generally closing within a few weeks.

Pulse-rate, 120 to 140.

Respiration. The lungs are collapsed, and the entire respiratory tract is devoid of air till the first respiratory effort.

The air-tract may contain vaginal blood and mucus from premature efforts at inspiration.

The first respiratory movement is due partly to air-hunger from arrest of the maternal supply of oxygen, and partly to the reflex muscular contractions caused by contact of cool air with the moist surface of the body.

Average rate of respiration, 45 per minute.

The Skin of the back and flexor surfaces of the limbs is more or less thickly covered with vernix caseosa, which consists of fatty matter, epidermic cells and sebaceous material. The epidermic layer exfoliates in the first few days, leaving the skin red and irritable.

The Bowels. The intestinal contents are known as *meconium*, and consist of intestinal secretions and bile, together with lanugo and epidermic scales derived from swallowed liquor amnii. The meconium is passed off, and the discharges become feculent within the first three or four days.

The Caput Succedaneum disappears within about twenty-four hours, and the head resumes its shape in the course of two or three weeks.

Genito-Urinary Organs. The bladder usually contains urine.

The urine has a specific gravity of 1005; it contains albumen and sometimes sugar.

The testicles have both descended into the scrotum.

The preputial orifice is too small to permit retraction of the prepuce over the glans during infancy.

Special Senses. Sensibility of the skin is feeble at birth, fully established during the first one or two days.

Taste: The newborn infant is sensitive to strong tastes only.

Sound: The child is deaf at birth, since the outer ear is closed and the middle ear is devoid of air. Loud sounds are audible within a few hours, or one or two days.

Sight: The eye is sensitive to light.

MANAGEMENT OF NEWBORN CHILD.

Respiration.—To expand the lungs, provoke deep inspirations by blowing upon the face, lifting by the feet to relieve anæmia of the medulla, by dashing a few drops of cold water upon the chest, or by flagellation.

Treatment of Apnoea.—*Direct Insufflation.* Place the child upon its back.

Make partial extension of the head by a fold of blanket under the neck.

Remove mucus from the pharynx by means of a soft rubber catheter, by suction. Cleanse the face and cover with a clean towel.

Prevent inflation of the stomach by pressure of the hand upon the epigastrium.

With the intervention of the towel, expand the lungs gently by mouth-to-mouth insufflation.

Repeat twenty times per minute as long as the heart beats.

Sylvester's Method. Child supine.

Head well extended by a fold of blanket under the neck.

Draw the arms well above the head for inspiration.

Place them by the sides and gently compress the thorax for expiration.

Schultze's Method. Suspend the child by the shoulders, face from the operator, feet down, placing the thumb in front and fingers over the posterior aspect of the shoulders with the index fingers hooked in the axillæ—inspiration. Relax the pressure of the thumb to assist inspiration.

Invert the position by swinging the trunk and lower limbs upward and toward the face of the operator, flexing the trunk in the lumbar region—expiration.

This method must be used with great caution, if used at all, in case of feeble infants.

Byrd's Method. Hold the child supine upon the two hands of the operator, at right angles to the fore-arms.

Tilt the hands by lowering their radial borders—inspiration.

Tilt the hands by raising the radial borders—expiration.

Auxiliary Measures.—Remove the mucus from the throat with the finger and a wet soft linen, or by aspiration with a soft rubber catheter.

If the child is pale and collapsed, give a rectal injection of water of 105° to 108° F. If cyanosed allow a drachm or two of blood to flow from the cord, to relieve the right heart. Maintain the normal temperature by immersing the child's trunk and extremities in water at $98\frac{1}{2}^{\circ}$ F.

Artificial Warmth. Wrap the child, head and all, in flannel and lay it in a warm place. Carefully prevent chilling.

Incubator. Puny infants, especially if premature, may be kept in an incubator for the first month or more, being removed from it only for feeding or bathing. The temperature in the incubator should be kept at about 90° , and gradually lowered to that of the room during the few days preceding the final removal of the child.

Rectal Injection.—Order a rectal injection of a tablespoonful of warm water to be given soon after birth to make sure the rectum is pervious.

Bathing.—The face should be bathed on birth of the head, and the eyes cleaned and carefully dried as a prophylactic against ophthalmia. The body should be smeared with sweet oil or vaseline to facilitate the subsequent removal of the vernix caseosa.

The full bath for the newborn infant is best given by immersion. Temperature 98° F. by the bath thermometer. Temperature of the room, 75° F. The slightest chilling is injurious. Duration of the bath ought not to exceed five minutes. A fresh boiled wash-rag of Turkish toweling should be used instead of a sponge. Only a mildly alkaline soap (Castile) should be used, and that sparingly. The scalp should be carefully cleaned. The child's mouth should be cleansed with water once or twice daily. The full bath may be repeated daily in the summer, about three times weekly in the colder months. Soiled parts of the body must be bathed as often as soiled.

In feeble children the full bath should be postponed for several hours or days. Rubbing daily with sweet oil or vaseline may be substituted. Infant powder is usually unnecessary.

Navel Dressing.—Dress the stump of the navel-cord with absorbent cotton impregnated with boric acid, subnitrate of bismuth or oxide of zinc; turn to the left side, and retain by a loose abdominal binder. Rapid desiccation is the chief reliance for the prevention of putrefactive changes in the stump, and the dressing should be ordered accordingly.

The cord should be dried, and redressed after each bath; or, after the first bath, rubbing with oil may be substituted for bathing till the cord falls off. This usually happens about the fifth day.

The navel wound should be kept surgically clean. Septic infection of the wound may lead to umbilical phlebitis and pyæmia.

Clothing.—The following is a simple and convenient dress for the first half year or more:

1. The usual napkin of cotton or linen diaper.
2. A flannel undershirt of the softest material, without sleeves and opening in front.
3. A fine flannel dress with high neck and long sleeves, cut *à la princesse*, opening in front, and about twenty-five inches in length.
4. A muslin slip of the same style as the flannel dress.
5. Woolen socks reaching to the knees.

All clothing, including the belly-band, should be loose enough to easily admit two or three fingers underneath it.

The belly-band is not needed after the navel heals.

In all seasons children of whatever age should wear woolen garments next the skin, and the extremities should be as warmly covered as other portions of the body.

No garment should be worn till properly laundered.

Nursing.—The child should be put to the breast after the mother has recovered from the shock of labor, usually within eight to twelve hours.

Both breasts should be nursed at each nursing. Ten or fifteen minutes is enough for each nursing.

Frequency. Once in four hours for the first day or two, then every two hours. Lengthen one interval in the night to four or six hours. Wake the child if necessary on the hour. The intervals should be extended to three hours by the age of three months.

Usually one or more artificial feedings daily will be required after the seventh or eighth month.

Wet-Nursing.—The best substitute for maternal nursing.

Choice of nurse: Should be of mature age, below thirty-five—multipara preferred.

Her child ought to be of the same age as that to be nursed within one or two months.

A menstruating woman is generally unsuitable, a pregnant one always.

Sound health is indispensable.

Examine especially for phthisis, syphilis and all contagious diseases.

Examine the nurse's child to learn whether it has been well nourished.

The breasts should be well developed, with prominent veins and well-formed and healthy nipples.

Weaning.—The child should be weaned, as a rule, after cutting eight teeth, except when that period falls in the hot months.

Evacuations of the Bowels should occur twice, not more than four times daily.

Sleep.—The newborn infant requires eighteen to twenty hours sleep out of the twenty-four: should sleep by itself in a crib or cradle.

ARTIFICIAL FEEDING. INFANT DIETARY.

FIRST SIX MONTHS.

Either of the following foods may be selected:

1. Milk Mixture.

Cow's milk—mixed dairy milk—	℥ x.
Water, previously boiled.	℥ v.
Milk sugar (recrystallized and perfectly pure),	℥ vi-gr. xlv.
Common salt,	gr. viii.
Lime-water,	℥ i.
Mix.	

2. Meigs' Mixture.

Cow's milk—mixed dairy milk—	℥ ii.
Cream*, containing twenty per cent. of fat,	℥ iii.

* Best, that obtained by the centrifugal machine, since it may be had fresh.

Water, previously boiled,	$\bar{3}$ x.
Milk sugar,	$\bar{5}$ vi-gr. xlv.
Lime-water,	$\bar{3}$ i.
Mix.	

3. Condensed Milk Mixture.

Canned condensed milk,	$\bar{3}$ i.
Boiled water,	$\bar{3}$ ix to xiv.
Cream,	$\bar{3}$ x.
Salt,	gr. v to viii.
Mix.	

During the first two or three weeks either of these first mixtures should usually be diluted by adding three to five ounces more water than the formula prescribes.

Mixture 1 and 2 should be prepared, bottled and sterilized soon after the milk is delivered, in quantity sufficient for the day's consumption.

Mixture 3 may be made fresh just before using. It is only partially sterile, but has the advantage of being more digestible and more easily prepared than the sterilized mixtures. The sweet brands are not objectionable.

Method of Sterilizing.—Ten clean bottles* are filled to the shoulders, each holding enough for one feeding. The mouths are then plugged with rubber stoppers.

The bottles are stood in a kettle and covered to the shoulders with cold water.

They should be boiled for twenty minutes or, better, steamed for thirty minutes, in a steam sterilizing apparatus.

The stoppers should be placed loosely in the necks of the bottles for the first ten minutes of the boiling, then pushed in firmly.

Should be kept on ice in hot weather.

Cow's milk, to be had in its best state, must be sterilized at the dairy immediately after milking and served in the sterilizing cans or bottles. When the can is first opened, the contents should be transferred to the nursing-bottles and re-sterilized.

Partial Predigestion.—Since sterilizing impairs the digestibility of the milk, it may be partially peptonized during the first two or three months. For this purpose add to the food at the

* Or as many as the number of daily feedings.

beginning of the feeding. extract of pancreas, Fairchild, gr. $\frac{1}{3}$, sod. bicarb.* gr. i. for each ounce of the prepared mixture, shaking the bottle.

Partial Sterilization.—*Method.* After filling and plugging, immerse the bottles for a moment in water at a temperature a little above 100° F. Then stand in a suitable vessel and pour boiling water in the vessel to cover the bottles to the necks. After a half hour remove the bottles from the water and transfer to the refrigerator for rapid cooling. Milk thus scalded and promptly chilled remains for at least twenty-four hours sufficiently sterile for practical purposes, and it is saved the injurious chemical changes that take place in prolonged exposure to temperatures above 175° F.

Feeding.—Warm the bottle to 100° F. before feeding and let the child nurse from the sterilizing bottle.

The nipple should be cleansed inside and out after each feeding, and the bottle in like manner.

The nipple should be boiled for ten minutes before using and the bottles before refilling.

AMOUNT AND FREQUENCY.—RULES FOR GENERAL GUIDANCE.

AGE.	INTERVALS OF FEEDING. †	AMOUNT AT EACH FEEDING. ‡	NUMBER OF DAILY FEEDINGS.	AVERAGE DAILY AMOUNT.
First day.	2 hours.	1 drachm.	10	10 drachms.
Second day.	2 hours.	$\frac{1}{2}$ ounce.	10	5 ounces.
Third day.	2 hours.	1 ounce.	10	10 ounces.
Second week.	2 hours.	$1\frac{1}{4}$ ounce.	10	$12\frac{1}{2}$ ounces.
Six weeks.	$2\frac{1}{2}$ hours.	$2\frac{1}{4}$ ounces.	8	18 ounces.
Three months.	3 hours.	4 ounces.	6	24 ounces.
Six months.	3 hours.	6 ounces.	6	36 ounces.

Small and feeble children require to be fed more frequently and in smaller quantities, large and robust children less frequently and in larger quantities than the foregoing table prescribes. The daily allowance required must be determined for the individual case by trial.

The stomach capacity, at birth, is approximately $\frac{1}{100}$ the weight of the child's body.

Take the child's weight once a week as a guide to the feeding.

* Omit the lime-water when the bicarbonate of sodium is to be used.

† Double one interval in the night.

‡ By measuring glass.

A well-nourished child gains at least five ounces weekly during the first five months.

SIX TO TWELVE MONTHS.

Five or six feedings daily, once in three to three and a half hours. Average daily amount, thirty-six to forty-eight ounces.

Some farinaceous material may, in most cases, be added to the food as follows:

Bread Jelly.—Soak four ounces of stale wheat-meal (Graham) bread in cold water for six or eight hours. Then squeeze the water out of it. Boil the pulp for one and a half hour in enough fresh water to make a thick gruel. Rub through a fine sieve and allow to stand. Mix, while fresh, one part of the jelly thus formed with eight of either of the foregoing mixtures before sterilizing.

Barley or Oatmeal Gruel.—Boil for at least half an hour a tablespoonful of barley or oatmeal in one pint of water. Occasionally add water to maintain the original pint. Strain and add salt to taste. Make fresh daily. Combine with either of the mixtures in the proportion of one part of the gruel to four of the mixture before sterilizing.

Barley gruel is better if there be looseness of the bowels, oatmeal in case of constipation.

Undiluted cow's milk mixed, in the proportions given, with any of the above-named farinaceous preparations, and sterilized, is frequently well borne by healthy children after nine or ten months.

TWELVE TO EIGHTEEN MONTHS.

Four or five feedings daily.

Whole milk, sterilized, with barley or oatmeal gruel or bread jelly in the proportions above given.

Two or three ounces of raw beef juice, moderately seasoned, may be given daily, either mixed with the milk or separately. It should be prepared at least twice a day.

The simpler kinds of food requiring mastication may be added after the child has sixteen teeth, such as oatmeal and milk, or wheaten grits, well cooked, or stale bread and milk.

Scraped beef or soft-boiled eggs may be allowed two or three times weekly.

EIGHTEEN MONTHS TO TWO YEARS.

Four or five feedings daily.

If the child is hearty a little fine cut meat may be given with the midday meal, such as tender beef, lamb or chicken. This, however, is not essential.

Milk should be the basis of the feeding till the child has all its teeth and may constitute a part of it for several years longer. Milk, beef juice and the farinaceous preparations mentioned afford a sufficient dietary for the entire period of infancy.

Proprietary foods for infants are not to be recommended.

DISORDERS OF THE NEWBORN INFANT.

Constipation.—*Laxatives.* ℞ Magnesiae calcinat. gr. x., Sacch. lact. gr. xx. Dose, a half teaspoonful mixed with water or milk.

Liquid magnesia. Dose, half to one teaspoonful.

℞ Sod. phosphat. gr. x., Sacch. lact. gr. x. per dose. May be given in a teaspoonful or two of water.

℞ Ext. semnæ fluid deodorat. (N. F.) ℥ss., Sod. et pot. tart. ʒi., Glycerin. ℥ss., Aq. ad ʒiv. Dose, a half teaspoonful, p. r. n.

Rectal Measures. Injection of clear glycerine, ʒi., sweet oil, ʒiv., or warm water, ʒi.; the addition of starch paste or white of egg or similar emollient to the water makes it less irritating. Use of a suppository of soap or cocoa butter or glycerine.

Indigestion.—Flatulence, stools green, curdy, sour.

Treatment. Regulation of the nursing or feeding; look to health of the mother. Sometimes useful to dilute the mother's milk by giving the child a teaspoonful of warm water during the nursing. Pepsin gr. i., in warm water ʒi. with each feeding is of service in certain forms of indigestion.

Colic.—Treat indigestion, for relief of pain, chloral gr. i., in water ʒi., or in syr. vanil. and water āā ℥ss., once to three times daily, p. r. n.; warm applications to the abdomen; a warm rectal injection, ʒi.

Simple Diarrhoea.—*Treatment.* Look to the feeding and the digestion. A mild laxative as a preliminary may be indicated to remove irritating material. Then bismuth subnitrat. gr. iii. to v. after each diarrhoeal movement. This failing, add tinct. opii camp. ℥ iii. to vi., p. r. n.

Thrush.—White patches upon the buccal mucous membrane, distinguished from milk curds by their firm adhesion.

Treatment. For destruction of the parasite a saturated solution of boric acid applied locally several times daily, or the following :
℞ Sod. sulphit. 3i., Aq. 3i. Sop the patches every two hours with the germicidal solution. For the stomatitis which remains after destruction of the fungus, use as a mouth-wash a half saturated solution of potassic chlorate.

Intertrigo.—Lycopodium and oxide of zinc equal parts, dusted upon the affected surfaces after cleansing, p. r. n. ; or the following ointment : ℞ Bismuth subnitrat. 3ii., Acid salicylic gr. v., Amyl. glycerit. 3i.

Cephalhæmatoma.—*Definition.* An extravasation of blood between the pericranium and the cranial bones ; it rarely occurs internally.

Location. Most frequently over the parietal bone, exceptionally at the site of the caput succedaneum. In a few days a hard ridge develops at the margin of the tumor from periosteal inflammation.

Prognosis. Grave in the internal form if cerebral symptoms develop. The external variety usually terminates in subsidence of the tumor, and recovery in about three months.

Treatment. Ordinarily none. If the tumor grows, shaving the head and firm strapping ; if pus forms, incision.

Icterus.—*Benign Form.* (a). Due to hæmatic changes, *i. e.*, destruction of red blood-corpuscles and decomposition of hæmogoblin. Conjunctivæ and urine not stained. Very common in the first week. Disappears after six or eight days.

(b). Dependent on hepatic conditions peculiar to the newborn child and consequent resorption of bile. Occurs most frequently in feeble infants, and after difficult labor ; conjunctivæ and urine discolored, stools clay-colored in well marked cases. Duration one to several weeks. Child usually suffers little inconvenience.

Treatment. Usually none required. In persistent cases, attention to the digestion, keeping the bowels open by enemata or possibly by the use of mild laxatives.

Grave Form. Rare. May depend on malformation of the bile ducts, septic infection, interstitial hepatitis from syphilitic or other causes. Distinguished by gradually increasing discoloration, and in septic forms by high temperature, etc.

Treatment must be addressed to the cause.

Ophthalmia.—*Cause.* Infectious material derived from the genital tract of the mother, generally the gonococcus of Neisser. Begins usually on or before the third day.

Prognosis. Grave in the absence of proper treatment. Twenty-five per cent. of all cases of total blindness are due to this cause.

Treatment. Prophylactic. Antiseptic cleansing of the maternal passages during labor in case of leucorrhœal secretions; careful cleansing and drying of the eyes immediately on birth of the head. Credé's method: Instillation of one or two drops of a two per cent. solution of nitrate of silver into each conjunctival sac directly after birth.

Curative. Application of cold in the earlier stages, ice water compress, in the absence of corneal complications. Removal of the pus every hour or two by bathing and irrigation with a saturated solution of boric acid. After free discharge is established brush the conjunctival surfaces, after cleansing, once or twice daily with a two or four per cent. solution of nitrate of silver. Continue till the discharge loses its purulent character. Frequent cleansing with the boric acid solution must be continued till all discharge ceases. Anointing the edges of the lids with vaseline promotes drainage by preventing the lids from gumming together. Drill the nurse thoroughly in the method of manipulating.

Umbilical Infection.—Most frequently erysipelatosus.

Cause. Uncleanly management of the umbilical wound.

Course. May result merely in a local ulcer, or in umbilical phlebitis and general septicæmia. In the latter case the termination is fatal, usually by convulsions. Phlegmon of the abdominal wound and peritonitis may result as complications.

Treatment. In local sepsis frequent antiseptic cleansing of the wound surface, and dressing with bismuth powder, or iodoform and bismuth. In general septic infection treatment is of no avail.

Tetanus Neonatorum.—Begins toward the end of the first week.

Cause. Infection of the navel with tetanus bacillus.

Symptoms as in surgical tetanus.

Prognosis. Almost uniformly fatal.

Treatment. Feed by the rectum with predigested food. Sulphonal gr. iii., q. 2 h., per rectum.

Umbilical Hemorrhage.—*Causes.* Faulty ligation of the cord; hepatic disease (syphilis, sepsis) resulting in increased blood pressure in the umbilical vessels; hæmophilia.

Treatment. In simple cases re-tie the cord and apply a compress, or transfix the umbilicus with a hare-lip pin and apply a figure-of-eight ligature. When the hemorrhage depends on obstructive causes and blood changes treatment is generally futile.

Mastitis.—Frequently present during the first week. Very rarely results in suppuration.

Treatment. None usually. Early incision in case pus forms.

Bloody Genital Discharge in female children, unimportant and requires no treatment.

OBSTETRIC SURGERY.

INDUCTION OF PREMATURE LABOR.

Indications.—Certain cases of narrow pelvis, when the delivery of a living and viable child is thus possible (flattening to between two and three-quarters and three and one-half inches or equivalent contractions).

Habitual death of the fœtus in the last month of gestation, from other causes than syphilis.

Nephritis of pregnancy, other measures failing.

Dangerous cases of placenta prævia after viability of the fœtus.

Certain cases of hydramnion, in presence of danger to mother or child.

Time.—Thirty-second to thirty-sixth week, according to the relative size of the head and pelvis.

Method.—*First Step.* Hot antiseptic douche against the membranes for twenty minutes.

Second Step. Separation of the membranes from the lower segment by means of a uterine sound, or the finger.

Third Step. Insertion of an English bougie between the membranes and the uterus.

Other Methods. Either of the above measures alone.

Galvanism or Faradism through the uterus, mild currents. Apply the poles upon the abdomen over the lateral walls of the uterus; or one against the cervix, the other upon the abdomen over the uterus.

Alternate applications over the abdomen of hot and of ice-cold water, for five minutes each (Schrader).

Care of the Child.—Maintain the bodily warmth by aid of artificial heat, best by means of an incubator, Auvard's or Credé's.

An improvised incubator may be made of a wooden box. It should have a removable lid, perforated with five or six half-inch holes at one end, and a false bottom with similar perforations at the opposite end. Heat may be supplied by hot bottles placed in

the compartment beneath the false bottom, or by means of a metal water-tank heated by a lamp. A thermometer placed beside the child should register constantly from 85° to 90° F. The use of the incubator should be continued for one or two months.

Gavage, or feeding through a soft stomach tube should be practised when the child is unable to nurse the breast or bottle or to be fed from a spoon.

INDUCTION OF ABORTION.

Indications.—Pregnancy nephritis with grave symptoms not yielding to other measures. Chronic nephritis.

Certain intractable cases of severe vomiting of pregnancy.

Extensive vesicular degeneration of the chorion.

Cancer of the cervix uteri.

Retroversion of the gravid uterus as a last resort.

Absolute contraction of the pelvis on election of the mother or in conditions unfavorable for laparotomy.

Methods.—Rupture of the membranes, or partial separation of the ovum aseptically, or cervical tampon of iodoform-gauze renewed after eight to twelve hours.

Mechanical dilatation of the cervix to the diameter of three-quarters of an inch and removal of the ovum with curette and forceps is a good method in experienced hands, before the third month.

These procedures are best practised in the latero-prone position with the aid of a Sims' speculum, the cervix being held with a volsella.

The induction of abortion should be undertaken only with the assent of competent counsel.

REMOVAL OF AN ABNORMALLY ADHERENT PLACENTA.

Note.—A placenta is abnormally adherent when in the absence of closure of the retraction ring it cannot be delivered entire by ordinary external and internal manual methods after two hours.

Etiology obscure. The cause probably resides in some abnormal condition of the endometrium.

Treatment.—Manual separation and extraction, hand in uterus. Begin the separation at the portion already detached. Make sure no fragments remain. Give a hot intra-uterine douche of a two per cent. solution of creolin, or 1:1000 of hydronaphthol. Inject hypodermically, ext. ergot fl., 3ss.

FORCEPS.

The Instrument.—*Description.* The parts of the forceps are the right and left arms, handles, shanks, blades and lock.

The blades have a pelvic and a cranial curve. A forceps for general use should be about fifteen inches in length, should have a moderate pelvic curve, an elliptical cranial curve about seven inches in length and three inches in width externally at the widest part.

The space between the tips of the blades when the instrument is closed should be about half an inch.

Care of the Instrument.—Cleanse it thoroughly and boil it for half an hour after using, or heat to 234° F.

Sterilize before using.

Keep free from rust and well polished.

Occasionally renew the nickel-plating.

Mechanical Action.—1. *A Lever.* An oscillating motion of forceps during extraction is a mechanical gain but is dangerous to the maternal soft parts. The use of forceps as a lever is to be condemned.

2. *A Compressor.* Compression of the head is attended with danger to the child and but slight mechanical advantage for extraction. In most seizures the compression is compensated by elongation of another transverse diameter. The pressure of the blades should if possible be light enough to leave no marks upon the head.

3. *A Tractor.* This is the principal use of forceps.

Indications for Forceps.—*Forces at Fault.* Cases of cephalic presentation in which nature is clearly incompetent to deliver with safety to mother and child. Generally—not always—when the head has been arrested for a half hour after two hours in the second stage.

Exceptional cases in which immediate delivery is demanded in the interest of mother or child, before the head engages.

Passages at Fault. Cases of obstruction in the bony pelvis, not below three and a half inches in its smallest diameter, or equivalent obstruction in the soft parts, after the equator of the head has engaged, if the child is viable.

Child at Fault. Certain cases of foetal dystocia,—*e. g.*, arrested occipito-posterior positions, certain cases of face presentation,

moderate hydrocephalus, after-coming head, impacted breech, foetal pulse above 160 or below 100, and others.

Complicated Labor. Certain cases of accidental hemorrhage, prolapsus funis, rupture of the uterus and of eclampsia, for rapid delivery, or of placenta prævia to bring head down as a tampon.

Dangers of the Forceps Operation.—*To the Mother.* Low operation, danger of vaginal lacerations and of other injuries to the pelvic floor.

High operation, lacerations of the cervix, the uterus, the vagina and the muscular structures of the pelvic floor ;

Separation of the pelvic joints ;

Contusions ;

Shock ;

Sepsis.

To the Child. Injury of the brain from compression, especially rupture of cerebral vessels ; temporary paralysis of the facial nerves ; deformities of the head.

The uncleanly, unskilled use of forceps is a dangerous operation.

Application of Forceps.—*Preparatory Measures.* Position : Dorsal, the American obstetric position ; the lateral decubitus is permissible.

Lubricate the forceps blades with vaseline sterilized by heat, or simply dip them into the antiseptic solution.

Canalization of the cervix should be complete, or nearly so.

The membranes should be ruptured.

Correct malpositions if possible.

Empty the bladder and rectum.

Passages, instrument and operator's hands and arms must be aseptic.

Anæsthetic, chloroform, ether, or a fresh A. C. E. mixture.

Application. Take the left arm of the forceps in the left hand and pass it on the left side of the pelvis—between the pains. Hold it at first nearly in a vertical line, and lightly, as you would a pen.

Pass two or more fingers of the right hand between the head and the left wall of the passages, the palmar surface inward, pushing the fingers to the base of the skull if possible.

Pass the blade along the palmar surface of the right hand and between the head and the walls of birth-canal, observing both the pelvic and the cranial curves, hugging the head. Avoid force.

Pass the right blade in a similar manner, the left hand serving as a guide.

Adjust the blades in the best possible seizure, as nearly over the transverse diameter of the head as possible. Sink the handles well backward, watching the perineum. If the arms do not lock readily readjust the blades till they do. Never force the locking.

Before using traction re-examine to make sure the blades are correctly applied.

Extraction.—*Grasp the handles lightly* near the lock, to avoid compression of the head.

Guard against Slipping. Readjust the blades to a good seizure if they begin to slip. Readjust, if necessary, as the head rotates in the lower part of the passages.

Traction should be intermittent—a pull and a pause. The pull should correspond to a pain, if possible, and should last one minute. Reinforce traction by *expressio fœtus* applied by an assistant.

Unlock the arms in the intervals to relieve pressure on the head.

Line of Traction. Apply the force in the direction of the birth-canal. In order to do this at the brim, grasp the handles with one hand and apply downward pressure with the other resting upon the shanks near the lock. With forceps of moderate pelvic curve, simple traction suffices after the head reaches the pelvic floor.

The direction is practically a straight line parallel with the posterior surface of the symphysis pubis till the head reaches the pelvic floor. The line of traction should then turn almost directly forward.

Sweep the handles upward till the anterior edges of the blades hug the ischio-pubic rami as closely as possible, without crushing the intervening soft parts.

Amount of Traction Force. From ten to eighty pounds.

Time is an important element in a safe forceps extraction. The resistance of the moving body, and therefore the violence to the maternal soft parts, increases as the square of the rate of motion. At least a half hour should be consumed in a low forceps delivery; more in a high operation.

Perineal Stage. The forceps may or may not be removed.

Give a half hour or more to the perineal stage of delivery, observing the normal mechanism.

Removal of the Forceps. When the forceps is removed before the birth of the head, the right blade* should be withdrawn first, carrying the handle well up over the opposite groin, protecting the soft parts by two fingers placed between the ischio-pubic ramus and the anterior edge of the blade, then the left in corresponding manner.

AXIS TRACTION FORCEPS.

Advantage.—Reduces the amount of traction force to a minimum by applying it in the line of descent, and, therefore, to the best mechanical advantage. Permits the normal movements of flexion and rotation as the head descends.

Position of Patient.—On a table, the dorsal; on low bed, the latero-prone.

Application.—Adjust the blades to light pressure and hold with fixation screw.

Traction.—Pull at the traction bar. The forceps handles serve to indicate the line of traction, which is regulated by keeping the traction rods nearly parallel with the forceps handles. Traction force should never exceed eighty pounds, rarely more than fifty pounds. Ordinary forceps may be substituted when the head reaches the pelvic floor.

VERSION.

Definition.—The complete or partial inversion of the foetal ovoid by manual interference, substituting the cephalic or pelvic pole for a less favorable presentation.

Cephalic version causes the head to present;

Podalic, the feet.

Methods.—*External*—applicable only before rupture of the membranes;

Bipolar;

Internal.

Indications.—*Cephalic.* Breech cases before labor, when all conditions are favorable, by the external method.

Shoulder presentations—cephalic to be preferred to podalic version when practicable. Should be done by the external or bipolar method.

Podalic. Certain cases of moderately flattened pelvis, head not engaged;

Dangerous cases of placenta prævia, as a rule:

*On the mother's right.

Cases of prolapsus funis not otherwise manageable ;
 Difficult face cases before engagement, brow, complex presentations ;

Most shoulder presentations ;
 For rapid delivery, in certain emergencies.

Dangers of Version.—*To the Mother.* External and bipolar, practically none as a rule.

Possible rupture of the uterus in difficult cases.

Internal. Increased risk of sepsis—preventable.

In all, increased danger of lacerations in rapid extraction, and of shock.

To the Child. As in spontaneous breech birth, also fracture of bones, compression of the spine in internal version.

EXTERNAL VERSION.

Indications.—Breech presentations, before labor ;

Shoulder presentations.

Is justifiable only when it can be accomplished without violence.

Method.—External manipulation,—one hand over each foetal pole ; push the head toward the occiput, the breech toward the feet. Operate between the pains. During pains hold the foetus to prevent reversion to the former presentation. Finally rupture the membranes and crowd the presenting pole into the excavation.

BIPOLAR VERSION.

Indications.—Placenta prævia in certain cases. (See Placenta Prævia.)

In all cases where version is indicated, the bipolar should be preferred to internal version, if practicable.

Advantages over internal version: A minimum of traumatism and shock ;

Lessened danger of infection ;

May be done early in the first stage of labor.

Method.—As a rule, operate with aid of anæsthesia. Manipulate between the pains. Place patient in dorsal or knee-chest position. Empty bladder and rectum. Pass one or two fingers of one hand through the cervix. Place the other hand over the opposite foetal pole externally.

Snare the arms. Pass a loop of tape over each and hold them down during version.

Push the breech toward the side on which the feet lie.

Toss the head out of the excavation into that iliac fossa toward which the occiput points.

Toss the trunk in the same direction inch by inch till the knees present.

Draw down a knee, or the knees and feet.

Complete the delivery as in spontaneous breech cases. A bipolar manipulation is also applicable for cephalic version.

INTERNAL VERSION.

Application.—All cases of version in which the other methods are impracticable.

Method.—Place the patient in the dorsal or knee-chest position, under an anæsthetic.

Protect the clothing of the operator with a sheet or long apron.

Pass one hand into the uterus over the abdomen of the child, palmar surface toward the child.

Relax the hand and desist from manipulation during the pains.

To prevent cramping of the hand, operate with the least possible muscular effort.

Seize the remote foot, or both feet, and invert the foetal ovoid by traction. If a hand is within reach, snare it and hold it down. The other hand of the operator may be used externally for counter-pressure over the fundus, or to assist the internal manipulation.

OBSTETRIC SURGERY OF THE ABDOMEN.

CESAREAN SECTION: HYSTEROTOMY: LAPARO-HYSTEROTOMY: CÆLIOTOMY.

Definition.—Delivery of the child by section of the abdominal and uterine walls.

Historical Note.—The operation antedates the Christian era. The earlier operations, however, were post-mortem Cæsarean sections done a few minutes after the death of the mother to save the child.

The earliest recorded case of Cæsarean section upon the living subject was performed in the year 1500.

Capabilities of the Modern Operation.—Timely operations under the Saenger method should save not less than ninety-two to ninety-five per cent. of cases.

Indications.—*Absolute Indication.* Pelvic obstruction sufficient to make embryotomy as dangerous to the mother as Cæsarean section, or more so—conjugate of two and a half inches or less, or equivalent contraction.

Cancer of the cervix, when delivery *per vias naturales* is impracticable.

Relative Indication. Conjugate above two and a half inches, yet disproportion too great to permit the delivery of a living child by the natural passages.

Preferred Time for Operation.—Shortly before the expected date of labor. Operation before labor permits better preparation, the uterus retracts as well and drainage is all-sufficient or can be made so.

Most authorities, however, prefer to wait till labor is established.

Before rupture of the membranes there is less traumatism, the child is more certainly alive and extraction is easier.

Preparatory Measures.—Reinforce the patient's strength before the operation by tonics and hygienic measures.

Move the bowels two or three times, a day or two before operating, if practicable.

Render the room, table and all surroundings of the patient aseptic.

Temperature of the room, 75° to 80° F.

The patient should have a total bath and clean linen.

Empty the bladder.

Make sure there is no loop of intestines between the uterus and the abdominal walls.

Sterilize the vagina and the cervical canal, the external genitals and their immediate surroundings.

Shave the pubes and field of operation.

Scrub the surface of the abdomen with soap and water, wash with alcohol and finally scrub with a 1-2000 mercuric iodide or bichloride solution, using sterilized brushes.

Wrap the body and extremities warmly with clean flannels, except the operative field.

Cover the clothing about the field of operation with cloths or towels, sterilized by boiling or steaming for half an hour, and finally spread over the patient and immediate surroundings a sheet fresh

from the steam-chamber and provided with an opening to expose the field of operation.

Instruments should be sterilized by exposure for fifteen minutes to a temperature of 234° F., or by boiling or steaming for one hour.

The hands and arms of the operator and assistants should be sterilized by the permanganate method, and their clothing covered with operating robes which have been steamed for an hour immediately before using.

Assistants.—First assistant should stand on the side of the patient opposite the operator.

Another is needed to give the anæsthetic.

One nurse takes charge of the steam sterilizer.

Another stands ready to receive the child.

Instruments.—Scalpel.

Straight scissors.

Thumb-forceps.

Six to twelve catch-forceps—hæmostatic forceps.

Needle-holder and needles.

Peaslee's needle.

Long catch-forceps for holding the sponge-compresses.

A large thin-walled rubber tubing (four feet long) as a constrictor for the neck of the uterus.

A steam sterilizer for sterilizing cheese-cloths, towels, etc.

A dozen silk sutures, No. 12, for the deep uterine suture.

A dozen fine silk sutures for the superficial uterine suture.

A dozen silk sutures, No. 12, for re-uniting the abdominal wound.

A dozen gauze-compresses to be used instead of sponges.

Summary of the Conditions of Success.—Timely operation ;

Aseptic technique ;

Deep uterine sutures, three to the inch, superficial between the deep sutures ;

Maintenance of the natural temperature of the abdominal viscera ;

The least possible handling of peritoneal surfaces ;

Operation within thirty to forty-five minutes.

Steps of the Operation.—Median incision of the abdominal wall ;

Application of the cervical constrictor ;

Median incision of the uterus :

Extraction of the child and placenta and eventration of the uterus;

Closure of the wounds and dressing of the abdominal wound.

Technique of the Operation. Inject in the thigh, hypodermically, ext. ergot fl., 3ss.

Abdominal incision from a little above the navel to a point one inch above the symphysis.

Expose the linea alba.

Incise the tendon, cautiously, exposing the sub-peritoneal fat.

Close bleeding vessels by catch-forceps or ligation before opening the peritoneum.

Lift the peritoneum with tissue forceps or catch-forceps, nick it with the scalpel or scissors close to the forceps, and extend the incision to the full length of the abdominal wound, using the finger as a guide.

Pass a loop of the constrictor over the fundus and adjust it around the cervix, tightening it only as required to control hemorrhage.

Let an assistant hold the uterus, by means of the constrictor, firmly against the abdominal incision and in central position.

Make a short incision through the uterine wall well above the retraction ring.

Lengthen upward with the fingers or scissors, falling short of the fundus.

Separate and push aside the edge of the placenta in case of anterior implantation.

Plunge the hand through the membranes and extract the child by the head or feet.

Clamp the cord at two points with catch-forceps, cut between them and pass the child to an assistant.

As the uterus slips out of the abdominal cavity hold back the intestines if necessary with hot sterilized towels laid over the upper portion of the incision, or by provisional sutures. The coverings also help to keep the liquor amnii and blood out of the peritoneal cavity.

Keep the uterus wrapped in hot moist cloths.

Remove the placenta and membranes and secure retraction by manipulation of the uterus or by Faradism.

The placenta if not spontaneously separated may be peeled off by grasping it with the hand.

If the membranes were unbroken when the operation was begun, or only recently broken, no antiseptics should be used in the uterine cavity.

Avoid irritating the peritoneum by handling, unnecessary sponging, or by contact of chemical antiseptics.

Close the uterine wound with deep silk sutures at intervals of one-third inch, avoiding the decidua. Enter them one-half inch from the incision and pass them obliquely inward.

Close the peritoneal coat of the uterus with sutures of fine silk, between the deep sutures. Unite the free surfaces after the manner of Lembert, or let the superficial sutures dip into the muscular coat.

Pull down the omentum over the uterus.

Remove the constrictor and secure retraction of the uterus by manipulation or Faradism.

Close the abdominal wound with silk sutures at intervals of half an inch. Let the assistant draw out the aponeurosis with forceps as the needle is passed, to ensure firm union of the tendon; or, suture separately the peritoneum and the tendon with catgut, the overlying structures with silk.

Give ext. ergot fl., 3ss., hypodermically.

Dress the abdominal wound with several thicknesses of dry sterilized cheese-cloth.

Leave two ounces of iodoform and boric acid—1:8—in the vagina.

After-Treatment.—Promote reaction by artificial warmth—by stimulants per rectum, if required.

Maintain a rigid cleanliness.

Catheterize the bladder every six hours for two or three days.

Put the child to the breast as in normal cases.

Begin feeding with light liquid food after twenty-four or thirty-six hours.

Open the bowels freely with salines given within a few hours after the first expulsion of flatus.

Remove the abdominal sutures by the tenth day.

The patient may usually leave the bed at the end of three weeks.

A firm abdominal binder or supporter should be worn for a few weeks after operation.

Post-mortem Cæsarean Section. In case of sudden death of the mother, the child may usually be extracted alive by abdominal section, if delivered within five minutes after the mother's death.

PORRO OPERATION : LAPARO-HYSTERECTOMY : CÆLIO-HYSTERECTOMY.

Note.—First performed by Edward Porro, of Pavia, Italy, in 1876. Subsequently modified by Müller.

Results should not differ materially from those of the Cæsarean operation.

Indications.—Certain tumors of the corpus uteri, as myomata, etc. ;

Retro-cervical or retro-vaginal myomata ;

Marked puerperal osteomalacia ;

A septic uterus ;

Hemorrhage after Cæsarean section, or after rupture of the uterus, not otherwise controllable ;

Pregnancy in a rudimentary horn of the uterus.

Technique.—Preparatory steps as in the classical Cæsarean section.

Abdominal incision large enough to admit the hand.

Ligation of the cervix with a finger-thick rubber tube, passing loop over the fundus, first drawing up the ovaries and tubes.

Eventration of the uterus.

Pack hot cloths about the cervix to keep blood out of the abdomen.

Rapid incision of the uterus and removal of the child and placenta.

Transfixion of the cervix by two or three knitting needles, or hat pins passed through the constricting tube and the cervix.

Amputation of the uterus three-quarters of an inch above the constrictor.

Ligation of the uterine arteries.

Suture of the abdominal wound, stitching the entire circumference of the stump in the lower angle.

Mummification of the stump with perchloride of iron solution.

Abdominal and vaginal dressings as in Cæsarean section.

LAPARO-ELYTROTONY: THOMAS' OPERATION.

Historical Note.—First proposed in the early part of the present century by Joerg. Physic. Sir Charles Bell and Ritgen. First completed operation by Baudelocque in 1843. Revived by Thomas and done by him in February, 1870. Practically obsolete since the revival of Cæsarean section by Saenger.

Advantages.—Avoids opening the peritoneum. Unimportant.

Disadvantages.—Circuitous route and difficult extraction of the child.

Danger of injuring the bladder.

Technique.—The usual preparatory treatment and antiseptic precautions.

Abdominal incision on either side, parallel with Poupart's ligament, a little more than one inch above it, extending from a point one inch or more above the anterior superior spine of the ilium to a point one and three-fourths inch from the pubic spine, going down to, but not through, the peritoneum.

Peel the peritoneum from the transversalis and iliac fasciæ and the posterior vaginal wall, and hold it and the intestines upward.

Isolate and protect the ureter.

Let assistant push the vaginal wall up into the incision by means of the finger or an obturator.

Incise the vaginal wall horizontally with blunt scissors or a cautery knife as far below the cervix as possible.

Mark the lateral limit of the bladder by a sound in the bladder and the finger of assistant in the vagina.

Lengthen the vaginal incision by the finger, mainly backward.

Extract the child through the wound by the feet or by forceps, the fundus being drawn to the opposite side by an assistant.

Deliver the placenta either by wound or vagina.

Inject the bladder with milk and water to detect possible laceration. Suture it if torn.

Pass one or two perforated drainage-tubes through the external wound into the vagina.

Suture the abdominal wound.

Dressing as in Cæsarean section.

During convalescence keep the wound and passages free from septic fluids by irrigation.

PUBIOTOMY: SYMPHYSIOTOMY.

Historical Note.—First proposed in 1768. After half a century it became obsolete. Revived in 1866 by Morisani, of Naples, Italy.

Indication.—Moderate contraction of the pelvis not below two and three-fourths inches, as an alternative of craniotomy.

Method of Operating.—Incise the overlying structures down to the symphysis pubis, avoiding the clitoris.

Pass a strong, curved, blunt-pointed bistoury, or the Galbiati knife, from above down along the posterior surface of the symphysis and divide the joint, cutting upward and forward.

After delivery suture the soft parts and immobilize the pelvic bones with a firm bandage.

OPERATIONS FOR REDUCTION OF THE BULK OF THE FŒTUS.**EMBRYOTOMY.**

The general term for all obstetric operations employed to facilitate delivery by lessening the size of the fœtus; by some writers restricted to operations for reducing the trunk.

Indications.—Hydrocephalus too large for safe extraction without perforation, and unmanageable by aspiration;

Certain cases of narrow pelvis, as an alternative of Cæsarean section, on choice of the mother, conjugate two and a half to two and three-fourths or three inches;

Obstructed labor with dead or non-viable fœtus, conjugate above two and a half inches.

CRANIOTOMY.

Definition.—An operation for the partial or complete comminution and removal of the cranial bones.

Steps.—1. *Perforation.* Instrument. Smellie's scissors or Naegele's or other perforator.

Empty the bladder and rectum.

Let an assistant steady the head by grasping it above the brim with the hands over the abdomen.

Pass the point of the perforator against the head, perpendicularly to its surface, just behind the pubes, using the fingers of one hand as a guide and guard. Puncture through a suture or fontanelle if possible.

Fix the point in the tissues by a screw-like motion and perforate in similar manner.

Separate the blades in different directions to enlarge the perforation.

For the cranial vault the best perforator is the trephine. It removes a button of bone.

The after-coming head may be perforated by making an incision through the skin at the base of the neck posteriorly and passing the perforator subcutaneously.

Break up the brain throughout with the perforator, especially the medulla oblongata.

Wash out the brain substance with a stream of water from a syringe.

2. *Comminution.* With the craniotomy forceps passed within the scalp, seize the cranial bones one by one.

Break them up by rotating the forceps about its long axis and dislodge them.

3. *Extraction.* Remove the bones, avoiding laceration of the passages, till the bulk of the head is sufficiently reduced.

Extract the fœtus, by means of the craniotomy forceps, the crotchet, by version, or when space permits by the cephalotribe. In extreme narrowing the cranial base may be delivered edgewise, drawing down the chin. Throughout the operation minute attention should be paid to antiseptic details.

CEPHALOTRIPSY.

Definition.—An operation for crushing the cranial vault.

Instrument.—Lusk's cephalotribe or Braun's craniolast.

Application of the instrument as in case of ordinary obstetric forceps, with care to get a good seizure, while an assistant crowds the head into the excavation.

Crushing.—The head is slowly crushed by turning a powerful screw at the handles.

Extraction as after perforation, piecemeal, or in bulk, using the cephalotribe as a tractor, guarding against laceration of the passages by projecting spicula of bone.

EVISCERATION.

Includes all operations for reducing the size of the trunk by removal of its viscera. Perforation of the trunk may be done with scissors or trephine.

DECAPITATION.

Methods.—1. *Blunt Hook and Scissors.* Let an assistant draw the neck firmly down by means of a blunt hook; gradually sever the neck with blunt scissors guarded by two fingers of the other hand.

2. *Braun's Sharp Hook* is a convenient instrument for decapitation.

3. *Écraseur.* Pass a tape around the neck, as follows: Oil it well, knot one end, pushing the knot over the neck with the fingers of one hand, catch it on opposite side with the fingers of the other hand, or pass the tape over the neck by means of an English bougie (with stylet) used as a carrier. Pull the chain into place by means of the tape. The *écraseur* is then operated as in ordinary uses of that instrument. A wire *écraseur* with piano wire or common picture wire may be employed for the purpose, or a chain saw may be used instead of the *écraseur*.

Extraction.—After decapitation push up the head and deliver the trunk, then extract the head, chin-first.

Beware of the danger of rupturing the uterus in these manipulations.

ABNORMAL LABOR.

ANOMALIES OF THE MECHANISM.

A. ANOMALIES OF THE EXPELLING POWERS.

I. Excess: Precipitate Labor.

Causes.—Violent expulsive efforts, from excessive reflex irritability:

Diminished resistance.

Dangers.—For the most part unimportant;
Chiefly lacerations and post-partum hemorrhage.

Treatment.—Moderate the expelling forces by regulating the abdominal pressure, and by chloroform.

II. Deficiency: Prolonged Labor.

1. PROLONGED FIRST STAGE: TARDY DILATATION.

(a). Inertia Uteri: Feeble Pains.

Causes.—Emotional causes; full bladder or rectum; imperfect development of the uterine muscle; fibroids, malignant or inflammatory disease of the uterus; anything that lowers the muscular or nervous tone.

Treatment, in the absence of danger to mother and child should be expectant. Simple inertia uteri calls for no interference so long as the membranes are unruptured and the patient gets sufficient sleep and nourishment. The bladder and rectum should be emptied and other causes removed, if possible.

Measures for Accelerating the First Stage when interference is required: Keeping the patient on her feet; hot sitz baths; alternate use of hot and cold compresses over the abdomen; quininæ sulphat. gr. v. to x., to rouse the nervous system; Faradic current from upper sacral region to posterior vaginal fornix; peeling up the mem-

branes from the lower uterine segment; the passage of an aseptic bougie between the membranes and the uterine walls after sterilizing the vagina and cervix. Interference within the passages, however, should be avoided if possible.

(b). Cramp-like Pains.

Uterine contractions painful but inefficient, more tonic than clonic; failure of the normal changes in the lower segment and cervix which favor dilatation.

Causes: Neurotic influences;
Cervical metritis;
Excessive uterine distention; hydramnion; twins;
Uterine obliquity; pendulous abdomen;
Dry labor and the consequent unequable pressure upon the cervix;
Malpresentation;
Pelvic obstruction;
Too firm adhesion of membranes to the lower uterine segment.

Symptoms of Cramp-like Pains.—Excessive pain with no progress in the absence of mechanical obstruction;

Rigidity of the cervix, as an index of the general condition of the uterus;

After rupture of the membranes, excessive caput succedaneum.

Dangers.—Exhaustion in proportion to the severity of the pain and the loss of sleep and nourishment. Paralysis of the uterus may result.

In dry labor, pressure effects in case of both mother and child, and septic infection.

Exhaustion predisposes to prolonged second stage.

Treatment.—Chloral, $\mathfrak{z}\text{i.}$, in three doses of gr. xx. each, at intervals of fifteen minutes.

Opium, gr. i., not repeated.

Chloroform rarely—prolonged chloroform narcosis is dangerous.

Rupture of the membranes in hydramnion: peeling them up in undue adhesion

Correction of too great uterine obliquity by posture, the binder or manual support.

In dry labor, manual dilatation: the use of Barnes' bags: gentle traction with forceps after dilatation is nearly complete.

Multiple incisions of the cervix when other means fail and immediate delivery is indicated. The latter treatment is safe only when the operator is prepared to suture the incisions if required for hæmostasis.

2. PROLONGED SECOND STAGE.

Causes.—Most of the causes which operate in slow first stage: Exhaustion:

Excessive uterine retraction—retraction ring more than half way from the pubes to the navel:

Faulty action of the abdominal muscles.

Dangers.—*To the Mother.* Exhaustion, pressure effects, sloughing: after rupture of the membranes, sepsis.

To the Child. Chiefly pressure effects.

Treatment.—Exclude obstructive causes by passing the hand into the vagina if necessary.

Evacuate the bladder and rectum.

Summon the aid of the abdominal muscles.

Quininæ sulphat. gr. x.

Hot fomentations to the hypogastrium, or the sacral region.

Semi-recumbent posture.

Ahlfeld's birth-stool—two stools so placed as to leave a triangular space between them, opening to the front. The patient sits over the open space till the head is about to be born.

A squatting posture during pains.

Ergot should be proscribed as dangerous to the child, and even, possibly, to the mother.

Treatment of cramp-like pains as in the first stage.

Expressio fœtus, applied at the upper foetal pole or to the head only. Push aside intestinal loops and, with one or both hands laid flat over the abdomen, press downward in the direction of the axis of the inlet.

Forceps is indicated when longer delay would be dangerous to mother or child; as a rule, when the head has been arrested a half hour, after two hours in the second stage, especially if the head is low down and there is no recession between the pains.

B. ANOMALIES OF THE PASSAGES.

I. ANOMALIES OF THE HARD PARTS: DEFORMED PELVIS.

Mortality.—Maternal, three or four times greater than in normal labor;

Fœtal, much greater than the maternal.

Dangers.—Those of prolonged labor intensified.

Malpresentation and malposition are more frequent than in normal pelves.

Certain complications:

Prolapsus funis;

Rupture of the uterus;

Post-partum hemorrhage, etc.

The minor degrees of deformity are dangerous for the most part to the child only, and are generally capable of successful management by early recognition and timely interference.

Frequency.—Contraction of some degree is present in ten to fifteen per cent. of all parturients.

The higher grades of deformity are rare.

Slight degrees of contraction are by no means so.

General Character of the Anomaly.—Rarely the abnormality consists in faulty inclination only.

In the majority of narrow pelves the contraction is at the brim, and is frequently an antero-posterior flattening.

Obstruction may arise from fractures, exostoses or other tumors.

Flattened Pelvis.

(a). *Non-Rachitic.* The commonest variety of contraction.

The conjugate rarely falls below three inches.

External diameters all diminished.

Relation between inter-cristal and inter-spinal diameters as in the normal pelvis.

A false promontory is sometimes present at the second sacral vertebra.

(b). *Rachitic.* Contracted antero-posteriorly at the brim.

Inter-spinal and inter-cristal diameters nearly equal.

Bis-ischial diameter increased.

Pubic arch widened.

Undue projection of the sacral promontory.

Frequently a false promontory at second sacral vertebra.

Sacrum flattened or convex from side to side.

Mechanism of Labor in Flat Pelvis. The head passes the brim with its long (occipito-frontal) diameter in the transverse of the pelvis, and with the sagittal suture level or nearly so.

Flattened and Generally Contracted Pelvis.

(a). *Non-Rachitic.* Has the characters of a justo-minor pelvis together with a sinking of the sacrum between the ilia.

Promontory low.

Symphysis short.

(b). *Rachitic.* Shape of the brim triangular.

Transverse diameters narrowed.

Subject of small stature.

Justo-Minor Pelvis: Pelvis *Æquabiliter Justo-Minor*.

A generally contracted pelvis.

Diameter not in all cases uniformly contracted.

In occasional cases the narrowing is confined chiefly to the outlet.

Its size bears no relation necessarily to the size of the body.

The deformity is due to arrest of development from rachitis, scrofula or hard labor in childhood.

Much less common than the foregoing forms of contracted pelvis..

Irregular Rachitic Pelvis.

A rachitic pelvis in which the shape has been modified in consequence of softening of the bones or of spinal curvatures involving the sacrum.

Funnel-Shaped Pelvis: Male Pelvis.

Pelvis narrowed at the outlet.

Tubera ischiorum approximated.

Antero-posterior diameter at the outlet may be shortened.

Subpubic angle narrow.

Sacrum long and slightly curved.

Cause of Deformity. Arrest of development of the lateral masses of the sacrum and coöperating causes.

Kyphotic Pelvis.

Upper end of the sacrum tilted backward.

Pelvic inclination diminished.

Transverse diameter of the true pelvis diminished.

Transverse diameter of the false pelvis increased.

Pelvis somewhat funnel-shaped.

Longitudinal curvature of the sacrum diminished, transverse curvature increased.

Pubic arch narrow.

Cause. Kyphosis in the lumbo-sacral region.

Nægele Oblique Pelvis: Anchylosed Obliquely Contracted Pelvis.

Anchylosis of one sacro-iliac joint.

Contraction in the oblique diameter from the acetabulum of the anchylosed side.

Distance from promontory to acetabulum, and from tip of sacrum to spine of the ischium, diminished on the affected side.

Distances from the spine of the last lumbar vertebra to the right and left posterior superior iliac spines unequal.

Symphysis not opposite the promontory.

Walls of the pelvic cavity converge below.

Pubic arch narrow.

Cause of Deformity. Asymmetry of the sacrum. The sacro-iliac joint on the affected side is either primarily or secondarily anchylosed.

Ordinary Oblique-Ovate Pelvis.

Shape similar to that of the Nægele.

Causes. Unequal pressure of the femora on the two lateral halves of the pelvis owing to :

Lateral spinal curvature—scoliosis ;

Impeded or abrogated function of one lower extremity from

Hip disease, or amputation of one lower extremity or old dislocation of the femur on the dorsum ilii.

Robert's Pelvis.

Anchylosed and transversely contracted pelvis.

Very rare.

Lineæ ilio-pectineæ approximated.

Subpubic angle narrow.

Ischial spine and tuberosity in close proximity to each other and to the margin of the sacrum.

Cause. Arrested development of the sacrum and sacro-iliac anchylosis on both sides.

Spondylolisthetic Pelvis.

Very rare.

Conjugate shortened.

Lower end of the sacrum tilted forward.

Cause. Gliding forward of the last lumbar on the first sacral vertebra. The inferior surface of the former finally rests upon the anterior surface of the latter and becomes firmly united to it.

Osteomalacic Pelvis: Compressed Pelvis.

Promontory approximates the pubes and the tip of the sacrum.

A prominence opposite each acetabulum.

Brim pointed anteriorly.

Subpubic arch nearly or quite obliterated.

Tuberosities approximated.

Anterior-superior spines of the ilia approximated.

Cause of Deformity. Osteomalacia and the consequent yielding of the pelvic bones to the existing pressures.

Narrowing of the Pelvis from Bony Tumors.

This form of obstruction comprises simple exostosis, displacement of the bones or callus due to fractures, malignant bony growths.

DIAGNOSTIC SIGNS OF PELVIC DEFORMITY.

Clinical Data.—Evidences of rachitis, such as tardy dentition, sweats, pigeon breast, curvature of tibiæ or spine, large joints; very low stature; deformities in near relatives.

Pendulous Abdomen.

Character of previous labors.

Presenting pole persistently above excavation during labor.

Pelvimetry.—Often the only means of diagnosis.

Method. Patient on a hard table, in dorsal decubitus, legs and thighs partly flexed.

External palpation for asymmetry.

External Measurements. Vide p. 61.

Schultze's pelvimeter.

External conjugate—seven inches the average lower limit in normal pelves.

Inter-spinal and inter-cristal diameters both small, indicates general contraction.

Inter-spinal equal to or greater than the inter-cristal, indicates flattening.

Internal Measurements. Method. Empty the bladder and rectum.

The hand is the best pelvimeter for internal measurements.

Note depth of the symphysis pubis ;

Width of subpubic angle ;

Bis-ischial diameter ;

Size and shape of the sacrum ;

Diagonal conjugate, as follows: Passing the index and second fingers into the vagina, place the outer edge of the tip of the second against the summit of the promontory. the radial edge of the hand against the subpubic ligament and measure the distance between the points of contact.

Find true conjugate by deducting one-half to three-quarters of an inch, according to the depth and inclination of the symphysis pubis, from the diagonal; one-half inch when the symphysis measures less, three-fourths inch when symphysis measures more than one and a half inch.

Note the other diameters by palpating the lateral walls of the cavity.

Management of Labor in Flat Pelvis.

Conjugate Three and a Half Inches or More. Nature. Spontaneous delivery of a living child is possible in the majority of cases.

Preserve the membranes, by colpeurynter if required. Correct malpositions if necessary. Keep bladder and rectum empty. Regulate the pains.

Alternatives: 1. Forceps—Tarnier—provided the head is engaged, child living and viable. Forceps is here much more dangerous to mother and child than in the normal pelvis.

2. Version (podalic) when head is not engaged, child living and viable, and other conditions favorable.

3. Craniotomy in case the child is dead and extraction by forceps or version would be difficult.

Conjugate Two and Three-Quarters to Three and a Half Inches. Premature labor.

Version (podalic) in moderate contraction.

Forceps with moderate traction when conjugate is above three and a quarter inches and head well engaged.

Symphysiotomy if child is viable and cannot be otherwise delivered alive by the natural passages.

Craniotomy or version, if child is dead.

Conjugate Two and a Half to Three Inches. Cæsarean section if all conditions are favorable and the mother so elects on full knowledge of the facts. Otherwise, craniotomy, or above two and three-quarter inches symphysiotomy.

Conjugate Two and a Half Inches or Less. Absolute contraction. Cæsarean section, or in certain cases, the Porro operation. (See Porro Operation.)

The choice of operation, however, in narrow pelvis, must be based on the relative rather than the actual size of the pelvis; in other words, upon the degree of disproportion between the head and pelvis. The size of the head should, therefore, be carefully estimated by palpation through the abdominal walls and by ascertaining the depth to which it has sunk or can be made to sink into the excavation, before deciding the choice of procedure for delivery.

In the higher grades of disproportion, if discovered in time, the claims of early artificial abortion should be considered.

Management of Labor in Spondylolisthetic Pelvis

is governed by the same rules as in flat pelvis, the controlling measurement being that of the false conjugate.

Management of Labor in Other Pelvic Deformities.

The choice of procedure must depend upon a careful estimate of the character and degree of obstruction.

The possibilities of a living birth by premature labor should be considered when the conditions are known in time.

At term, nature is competent in a small proportion of cases. When the delivery of a living child is possible by the natural passages, version should be preferred to forceps. When the difficulty is due more to failure of adaptation than to lack of space, the use of forceps is permissible only after the head has sunk into the excavation, and then, as a rule, only tentatively and with moderate traction. In the higher grades of obstruction, Cæsarean section should be preferred to craniotomy, provided all conditions are favorable for both mother and child.

II. ANOMALIES OF THE SOFT PARTS.

Vulvar Atresia.

Inflammatory adhesions of the labia majora :

(Edema vulvæ :

Thrombus ;

Cancer ;

Simple rigidity :

Rigid hymen.

Treatment of Thrombus. Nature or forceps ; rarely incision, evacuation of the clots and styptic packing.

Treatment of Rigid Hymen. Single or multiple incisions.

Treatment of Other forms of Rigidity. Forceps. Episiotomy, when delivery without notable laceration is otherwise impossible.

Vaginal Atresia. — 1. Congenital. (a). Annular stricture. (b). Narrowness throughout.

2. Acquired, resulting from inflammation.

Treatment. Scissors and forceps : or delivery by Cæsarean section according to the degree of obstruction.

Cystocele.—*Treatment.* Catheterize and replace.

The use of the catheter being impossible, aspirate.

Rectocele.—*Treatment.* Replace, in latero-prone or genu-pectoral position.

Rigidity of the Cervix.

Atrophic changes in aged primiparæ.

Hypertrophy of the portio vaginalis.

Cicatrical tissue.

Treatment. Manual dilatation. Multiple incisions, rarely.

Cancer of the Cervix.—*Treatment.* Removal of the diseased tissue if practicable during pregnancy, best at the fourth month.

Premature labor.

Manual dilatation.

Cervical incisions through the healthy tissues by thermo-cautery.

Forceps.

The passages should be repeatedly douched with an antiseptic solution during and after the labor. Mercurial solutions, however, should not be used.

Cæsarean section or Porro may be required in exceptional cases.

Occlusion of the Os Externum.—*Treatment.* Re-open the os by incision from behind forward.

Tumors.—*Treatment.* (a). *Vesical Calculi.* Reposition: replacement impossible, remove by vaginal lithotomy.

(b). *Vaginal Tumors.* Removal, if possible; otherwise Cæsarean section or the Porro operation.

(c). *Uterine Tumors.* Pedunculated tumors may sometimes be pushed above the head with the aid of the genu-pectoral position, or removed with *écraseur* or scissors. The Cæsarean or Porro operation may be required.

Ovarian Cysts.—*Treatment.* Ovariectomy during pregnancy. Reposition. Aspiration through the vaginal fornix.

Ovariectomy at the beginning of labor. Cæsarean section in case of obstruction, not otherwise manageable.

C. ANOMALIES OF THE PASSENGER.

PERSISTENT OCCIPITO-POSTERIOR POSITIONS.

In most cases in which the head offers primarily in occipito-posterior position, the occiput rotates to the front, either above the brim, in the cavity, or at the vaginal outlet. In a certain proportion of cases the sinciput rotates to the pubes and the head must then pass the pelvis with the occiput in the hollow of the sacrum. In this position the long diameter of the head does not conform fully to the axis of the pelvis. The labor is thus impeded. Not infrequently in neglected posterior positions of the occiput, the head becomes arrested by impaction in the pelvic brim.

Causes of anterior rotation of the sinciput:

Imperfect flexion:

Diminished resistance of the pelvic floor;

Certain deformities of the pelvis.

Dangers in persistent occipito-posterior positions:

To the Mother. Exhaustion; laceration of the perineum.

To the Child. Those of prolonged second stage. Mortality fifteen per cent.

Diagnosis.—*Abdominal Signs:*

No dorsal plane;

Small parts in middle section of the abdomen;

Face front;

Heart distant;

Anterior shoulder remote from median line.

Vaginal Signs. Large fontanelle easily accessible indicates either an occipito-posterior position or an imperfectly flexed anterior position. Distinguish by relative situation of fontanelles.

Treatment.—*Above the Brim.* Rotate by combined internal and external manipulation, one hand in the vagina, fingers firmly grasping the head.

In the Cavity. Promote extreme flexion by pressure against the forehead.

Let patient lie on the side toward which the occiput points.

Assist rotation, cautiously.

Treat insufficient pains as in other cases.

In case of impaction or powerless labor, forceps—Tarnier—if delay becomes actually or prospectively dangerous to mother or child.

At the Vaginal Outlet. Rotate by backward pressure with the fingers placed against the anterior temple, combined if necessary with forward pressure upon the occiput.

FACE PRESENTATION.

Frequency.—1:250.

Cause.—Most commonly extension of the head at the beginning of labor due to

Narrow pelvis :

Brim narrowed by prolapsed extremity ;

Large child ; enlargement of the neck or thorax ;

Excessive obliquity of the uterus ; pendulous abdomen :

Mobility of the fœtus from small size, or from excess of liquor amnii ;

Impaction of the occiput in occipito-posterior positions.

The preponderance of left mento-anterior positions is explained by the right obliquity of the uterus.

Mechanism.—The head descends with its occipito-mental diameter in relation with the axis of the birth-canal, but with that diameter inverted, mental pole first.

The engaging plane is the trachelo-bregmatic, three by three and a half inches or little more.

The difficulty of face births is due to the fact that the thickness of the neck and a portion of the chest is added to the long diameter of the face as the face descends, making a total diameter of six and a half inches.

Positions :

Left mento-anterior—L. M. A.

Right mento-anterior—R. M. A.

Right mento-posterior—R. M. P.

Left mento-posterior—L. M. P.

Mechanism of Mento-Anterior Positions.—*Movements.*

1. *Extension.* Corresponds to flexion in vertex births.
2. *Rotation.* Unlocks the difficulty of face birth. Failure is more serious than in vertex presentation.

The mechanism is the same as in vertex (*mutatis mutandis*).

3. *Flexion.* Corresponds to extension in vertex deliveries.

The head rests by the lower surface of the inferior maxilla upon the margins of the ischio-pubic rami as pivotal points, and is expelled by a movement of flexion, the face, the forehead, the vertex and the occiput successively sweeping over the perineum.

4. *External Rotation or Restitution.*

Mechanism of Mento-Posterior Positions.—In a typical case the birth of persistent mento-posterior positions is impossible, since it would require a diameter of six and a half inches to pass through the pelvis.

Spontaneous rotation of the chin to the front is generally possible.

Dangers.—*To the Mother.* Exhaustion.

To the Child. Cerebral congestion from pressure on the veins of the neck. Rotation failing, nearly all die.

Prognosis.—Mortality, six per cent. of the mothers, thirteen per cent. of the children.

The face of the child is usually much disfigured.

Diagnosis.—*Abdominal Signs:*

Hour-glass shape of the uterus;

Cephalic tumor very round and filling only one side of the pelvis;

Cephalic prominence in relation with the back and generally on the same side of the median line with the breech;

Sulcus at the junction of the head and back;

Heart and small parts on the same side;

Inferior maxilla accessible to palpation.

Vaginal Signs:

Orbital ridges;

Nasal bones;

Malar bones;

Alveolar processes;

Chin.

Treatment.—Nature is competent in a large proportion of mento-anterior cases, also in most mento-posterior cases that rotate.

Preserve the membranes.

At the Brim: Convert into vertex by the method of

1. Schatz, thrusting the breech forward* with one hand, the chest backward and upward with the other, by external manipulation, and finally crowding the breech downward. Applicable only before rupture of the membranes.

2. Baudelocque, pushing up with the fingers first against the chin, then the fossæ caninæ, then the brow.

3. Both combined, under chloroform if required, with the help of an assistant.

Version, especially with prolapsus funis.

In the cavity, promote extension, assist rotation by drawing the chin forward during a pain.

Forceps in case of impaction or delay in mento-anterior positions.

Craniotomy, if the fœtus is dead or face is immovably fixed and all other measures fail.

BROW PRESENTATION.

Brow presentation is a semi-extension of the head.

Persistent semi-extension is rare: partial extension is generally converted spontaneously into vertex or face.

Frequency.—About 1 : 18,000.

Causes.—Substantially as in face presentation.

Positions.—As in face presentation.

Prognosis.—Delivery in persistent brow cases is possible, only with a relatively large pelvis.

Diagnosis.—*Abdominal Signs.* Those of face presentation imperfectly developed.

Vaginal Signs. Orbital ridges on one side, bregma on the other side of the presenting part.

Treatment.—Conversion into vertex by seizing the head, pushing it up and hooking down the occiput, hand in the vagina, under anæsthesia: support the fundus by firm pressure with the external hand.

Or, conversion into face by traction on the upper maxilla with the fingers; not advisable in mento-posterior positions.

Version, for rapid delivery if indicated in interest of mother or child.

* Toward the child's feet.

Craniotomy, in dead fœtus; rarely justified on the living fœtus, and only when urgently demanded in the interest of the mother.

PELVIC PRESENTATION.

Varieties.—Breech, knee, footling.

Frequency.—1:60, exclusive of premature births.

Causes: Narrow pelvis;
 Uterine tumors;
 Placenta prævia;
 Hydrocephalus;
 Multiple fœtus.
 Conditions favoring mobility of the fœtus, *e. g.*,
 Multiparity;
 Prematurity;
 Lax uterine walls;
 Hydramnion;
 Shape of uterus possibly;
 Small fœtus.

Mechanism.—*Positions:*

Left sacro-anterior—L. S. A.
 Right sacro-anterior—R. S. A.
 Right sacro-posterior—R. S. P.
 Left sacro-posterior—L. S. P.

Rotation in breech is not so marked as in head presentation.

The shoulders rotate more or less perfectly.

The head rotates as in vertex births.

Spontaneous expulsion of the after-coming head is exceptional.

In dorso-posterior positions the occiput almost invariably rotates eventually to the front.

In persistent dorso-posterior positions the after-coming head is generally delivered mentum first.

The chin catching upon the pelvic brim, delivery may be accomplished occiput first.

Prognosis.—*Mother.* Risk to life not increased.

First stage may be more tedious.

Second stage is frequently more rapid.

In artificial delivery, laceration of the cervix is more frequent than in vertex births; laceration of the perineum is the rule.

Child. Mortality very great; without interference, one in three or four; with skilled management but little greater than in vertex births.

Indications of danger to the child after delivery of the breech:

- Funic pulse irregular and feeble;
- Convulsive movements;
- Occasional gasping respiratory movements.

Causes of Fœtal Mortality. Apnœa from

Impeded blood supply due to retraction of the uterus after expulsion of the trunk:

Pressure upon the funis. after the head engages.

The danger is increased in dry labor.

Diagnosis.—*Abdominal Signs:*

Fundal pole hard, globular, ballots, sulcus between it and trunk;

Lower pole irregular in shape, not so hard, in primiparæ above excavation before labor.

Vaginal Signs:

Glove-finger protrusion of the membranes;

Absence of the hard globular head;

Absence of fontanelles and sutures;

Tuberosities of the ischium;

Tip of the coccyx, anus, genitals, on a line bisecting the bis-ischial line at right angles:

Femora;

Expulsion of the meconium—not diagnostic—may occur in cephalic births.

Identify foot, knee, shoulder, elbow, hand, by their anatomical characters;

In differentiating between head and breech, beware of relying on mere casual touch. Search minutely every accessible part of the presenting pole and with firm pressure if impacted in the excavation.

Treatment.—*Before Labor.* External version in favorable cases.

During Labor. General Plan of Treatment. The danger to the child is chiefly due to the difficulty of delivering the after-coming head before the child dies of apnœa, from pressure on the cord. Child undelivered dies within five minutes after the head engages.

The delivery of the after-coming head is facilitated by

1. Full dilatation of the passages;
2. Complete flexion of the head and arms.

Promote (1) by preserving the membranes till they reach the pelvic floor, and, as a rule, keeping the dilating fluid wedge intact.

Accomplish (2) by avoiding traction till the trunk is delivered; or, when traction is unavoidable, by external manipulation, by an assistant.

A. Dorso-Anterior Positions. Preliminaries: On expulsion of the trunk wrap it in a flannel or towel to prevent premature efforts at respiration.

Have the forceps ready.

Examine the funis for pulsation, and watch it for warning of danger to child.

Pull the funis down and dispose by the sacro-iliac joint in that half of the pelvis which offers the most room.

Management of the Arms:

(a). *Arms Flexed:* Deliver by hand passed along child's abdomen.

(b). *Arms Extended:* 1. *Delivery of the First Arm.* As soon as a shoulder-blade can be reached, seize the feet and draw the trunk to the side opposite the occiput.

Deliver the posterior arm first.

Pass the free hand up along the dorsum and slip one or two fingers over the shoulder and along the humerus to the elbow.

Sweep the elbow across the face and down.

2. *Delivery of the Second Arm.* Bring the child's trunk into the long axis of the mother's body. Seize the trunk with both hands, and push it up to unlock the head and extended arm from the grasp of the pelvic brim. Rotate the trunk to carry the extended arm opposite the nearest sacro-iliac joint. Then changing hands, deliver the arm in same manner as the first. Or, while sweeping the second arm across the face, assist rotation of the head by external pressure on the occiput.

Delivery of the After-coming Head. Dorso-anterior Position. Rotate the head to bring the face opposite one of the sacro-iliac joints.

Combine:

1. Expressio foetus by an assistant.
2. All the voluntary expelling powers of the mother.
3. The Smellie-Veit (Mauriceau) method, as follows:

Apply traction by two fingers hooked over the shoulders, astride the neck, maintaining extreme flexion by two fingers of the other hand pressed against the fossæ caninæ or the lower maxilla, trunk lying along the fore-arm of the operator or upon the abdomen of the mother.

Keep the long diameter of the head in the oblique diameter of the pelvis, until past the brim.

Wigand-Martin Method. The most effectual manual method if compelled to operate without assistance. Maintain flexion as above and deliver by suprapubic pressure with the other hand.

Forceps, applied to head, trunk held up on the abdomen of the mother.

B. Dorso-Posterior Positions. Rotate the occiput to the front after the expulsion of the body by gentle torsion of the trunk or by pressure on the anterior temple. Then proceed as in primary anterior positions.

Rotation failing, deliver by traction and suprapubic pressure downward and backward over the perineum.

The chin catching over the brim of the pelvis, deliver occiput first by traction downward and forward.

Nuchal Arm. On delivery of the trunk rotate the body three-quarters of a circle in the direction *from* the misplaced arm. Then proceed as in ordinary cases.

Failure of the Powers at or above the Brim. Bring down one or both feet, if this be possible, without violence.

Impaction. Traction by finger, fillet, forceps.

In dorso-anterior positions, deliver by the finger or fillet in one groin.

In dorso-posterior positions, adjust a soft oiled fillet so that the loop may encircle the pelvis, the free ends depending between the thighs; or hold the fillet in the groin with one hand, making careful traction with the other hand.

Forceps. Apply one blade over the sacrum and ilium, the other over the posterior surface of the opposite thigh, or adjust the blades over the trochanters, avoiding pressure upon the ilia. Use moderate traction, assisted by expressio fœtus.

The cephalotribe is permissible on the dead fœtus.

TRANSVERSE PRESENTATION. SHOULDER PRESENTATION.

Varieties.—Shoulder, arm, hand.

Frequency.—1 : 250.

Causes: Unusual mobility of the fœtus from causes already enumerated under pelvic presentation ;

Twin pregnancy ;

Fœtal tumors ;

Uterine myomata ;

Undue pelvic inclination ;

Deformed pelvis ;

Low attachment of the placenta.

Positions :

Left scapula-anterior—L. Sc-A.

Right scapula-anterior—R. Sc-A.

Right scapula-posterior—R. Sc-P.

Left scapula-posterior—L. Sc-P.

In left positions the fœtal head is on the mother's left, in right positions on the mother's right.

Prognosis.—In persistent transverse positions one out of ten of the mothers and one-half of the children die.

Dangers to the Mother. Pressure effects, exhaustion, rupture of the uterus.

Dangers to the Child. Pressure, prolapsus funis.

Diagnosis.—*Abdominal Signs :*

Absence of both fœtal poles from the excavation during labor ;

Presence of the head in one iliac fossa.

Vaginal Signs :

Glove-finger protrusion of the membranes ;

Absence of the hard globular head ;

Absence of any presenting part at the beginning of labor :

Presenting part a small rounded prominence : distinguish it from the ischial tuberosity by the absence of a companion ; from it radiate the humerus, the clavicle, the spine of the scapula ;

Neck on one side of the presenting part, ribs on the other :

Axilla ;

Elbow, identified by the olecranon.

Diagnosis of Position made by location of head, right or left, and of scapula, anteriorly or posteriorly.

Axilla or elbow looks toward the feet :

Thumb toward the head.

Distinguish hand from foot, right from left hand. Shake hands with the foetus—the right hand of the examiner fits the right hand of the foetus, and conversely.

Spontaneous Delivery.—*Spontaneous Version* into breech or vertex takes place in the majority of cases before engagement.

Spontaneous Evolution. The breech is forced past the presenting shoulder and delivered first.

Expulsion with Trunk Doubled on Itself. Possible only when disproportion between size of pelvis and foetus favors. Almost invariably fatal to the child.

Treatment.—*Before Labor.* External cephalic version. Retain by abdominal binder and lateral compresses.

During Labor. (a). *Ordinary Cases.*

Preserve the membranes.

Evacuate the bladder and rectum.

Note capacity of pelvis, size of child, situation of retraction ring, and degree of thinning of lower uterine segment.

Deliver by version, cephalic or podalic, by the external, bipolar or internal method.

(b). *Impacted and Irreducible Cases.* Decapitation.

TREATMENT OF COMPLEX PRESENTATIONS.

Head and Hand. Replace the hand; this failing, forceps, placing the arm in the unoccupied side of the pelvis.

Version, in suitable cases, head not engaged.

Hand and Foot. Podalic version.

Head, Hand and Foot. Reposition of prolapsed extremities. This failing, podalic version.

Nuchal Arm. Diagnosis by hand in the passages, under chloroform.

Dislodge the arm. Rotate the body *from* the nuchal arm.

Version.

In most cases of complex presentation, foetus dead, delivery is best accomplished by craniotomy, in the interest of the mother.

ANOMALIES OF DEVELOPMENT.**MULTIPLE FŒTUS.***Relative Situations of Twins:*

One beside the other:

One above the other:

One in front of the other.

Diagnosis. Vide p. 40.

Management. Expedite the second birth: deliver by forceps or version in delayed labor.

INTERLOCKING TWINS.

Presentations. (a). Both cephalic. Both heads offering, one impacted between the head and trunk of the other fœtus.

(b). One cephalic, one pelvic. The after-coming head of the breech birth impacted between the head and trunk of the other fœtus.

Management. Disengagement by combined internal and external manipulation with the aid of the knee-chest position.

Decapitation of the first child as a last resort.

DOUBLE MONSTERS.

Premature birth and spontaneous delivery is the rule.

Embryotomy, in difficult cases.

HYDROCEPHALUS

Consists of enlargement of the cranial vault, due to serous effusion into the cranial cavity.

The effusion is usually found in the ventricles; very rarely in the arachnoid sac. Quantity may amount to several pints. Spina bifida or other anomalies generally co-exist.

Etiology obscure.

Diagnosis.—(a). *Head-first Cases.*

Abdominal Signs. Measurements of the head taken with a pelvimeter or callipers through the abdominal wall, or estimated by palpation.

Vaginal Signs:

Size of the cranial vault;

Elasticity;

Fluctuation;

Increased width of sutures; this, however, may occur in the absence of hydrocephalus:

Large fontanelles;

Prominence of the frontal and parietal bones:

Sometimes a supplementary fontanelle between the anterior and posterior.

Confirm if necessary by the hand in the vagina under anaesthesia.

(*b*). *Head-last Cases.* One in five present by the breech. The signs are:

Body wasted;

Head arrested after birth of the trunk:

Measurements of the head taken through the abdominal wall.

Prognosis.—*Child.* Mortality over eighty per cent: if born alive, viability feeble: nearly all die soon after birth.

Mother. Mortality eighteen per cent. from exhaustion, rupture of the uterus, hemorrhage.

Treatment.—Expectant, version or perforation, according to the degree of obstruction.

Aspiration of the cavity with a small trocar passed through a fontanelle or suture may frequently be substituted for craniotomy.

Cephalotribe as a tractor.

Head-last Cases. Perforate the head, or open the spinal canal and catheterize the cranial cavity.

SEROUS EFFUSIONS INTO OTHER CAVITIES, OR EMPHYSEMA.

Treatment. In case of marked dystocia, aspiration of the dropsical cavities, or incision.

Embryotomy.

TUMORS.

Hygroma, fibroma, carcinoma, spina bifida, enlargement of abdominal viscera and others.

Treatment. When delivery of the foetus intact is impossible, for fluid tumors, tapping, incision, laparotomy:

For solid segmentation of the tumor, laparotomy.

PROLAPSUS FUNIS.

Frequency.—1 : 250.

Causes.—Anything which prevents the presenting part from completely and continuously filling the lower uterine segment, *e. g.*,

Hydramnion;

Pelvic deformity;

Malpresentation: (Frequency in head presentation 1 : 304,
face 1 : 32, pelvis 1 : 21, shoulder 1 : 12.)

Complex presentations;

Twins;

Myomata, etc.; also.

Pendulous abdomen:

Low placental insertion:

Marginal insertion of the cord:

Excessive length of cord.

Prognosis.—No increased risk to the mother from the prolapse: there may be from the conditions which give rise to it.

No presentation more fatal to the child.

Fœtal mortality 1 : 2; greatest in vertex and in first labors.

Diagnosis.—Before rupture of the membranes, differentiate from fingers, toes, loop of intestine in rupture of the uterus.

Examine for the funic pulse. Absence of pulsation for fifteen minutes may be taken as evidence of death of the fœtus.

Treatment Before Rupture of the Membranes.—Preserve the membranes. The membranes should never be ruptured in ordinary labors without first examining for possible prolapse of the cord.

Maintain the latero-prone posture. Place the patient on the side opposite that on which the cord comes down. Push the cord up carefully between the pains avoiding rupture of the membranes.

After Rupture of the Membranes.—*Reposition.*

(a). *Manual Method.* Place the patient in the latero-prone or the genu-pectoral position. Twist the prolapsed loop lightly into a rope and replace anteriorly by taxis, between the pains.

For retention crowd the presenting pole firmly into the pelvic brim and hold it there. Keep the patient in the latero-prone position with the hips elevated.

(b). *Instrumental Method.* Posture as in the manual method. Reposit by means of an English catheter with a tape attached and loosely looped over the cord, and leave the catheter in the uterus. The catheter should be armed with a stylet, which should be withdrawn after repositing.

Crowd the presenting pole into the excavation after repositing the cord to prevent recurrence of the prolapse.

Emergency Cases. In many cases immediate extraction must be done to save the child.

Method. Cephalic cases, forceps if the head can be made to engage. Malpresentations, or head persistently above the brim, podalic version. Breech cases, cephalic version, or as in ordinary breech extraction.

Precautions. Watch the fetal heart. Much handling of the cord is dangerous to the child; it enfeebles the heart. Don't subject the mother to the manipulation for reposition of the cord if the child is surely dead or non-viable.

INVERSION OF THE UTERUS.

Degrees and Forms.—Depression of the fundus :

Partial inversion ;

Complete inversion ;

Inversion of the lower segment.

Frequency.—About 1 : 200,000.

Etiology.—Inertia uteri in the third stage is the principal cause; Maladroït pressure on the uncontracted fundus, Traction on the cord while the uterus is relaxed, or, A fundal placental seat may be complicating causes. Inversion rarely occurs after delivery of the placenta.

Prognosis.—Grave, without prompt reposition.

Mortality, one-fifth to one-third, from hemorrhage and shock, or peritonitis and gangrene of uterus, even under skillful management.

Diagnosis.—*Symptoms :*

Shock ;

Pain ;

Hemorrhage ;

Vesical and rectal tenesmus.

Signs. (a). *In Partial Inversion.* Cup-like depression felt at the fundus by abdominal touch.

(b.) *In Complete Inversion.* 1. Absence of the usual abdominal tumor, demonstrated by abdominal palpation, by combined abdominal and vaginal or rectal examination. Catheterize the bladder and empty the rectum; exclude morbid growths.

2. Presence of a vaginal tumor.

3. Character of the tumor. Differentiate from polypus by:
 Special contractility—note if it hardens under manipulation;
 Large pedicle;
 Pain and immobility on attempting torsion;
 Uterine sound.

Differentiation is sometimes difficult.

Note that the placenta may still be adherent.

Treatment.—*Preventive.* Proper management of the third stage.

Reposition. Method. (a). Simple Cases (within a few hours after inversion).

Patient under an anæsthetic.

Place one hand on the abdomen over the inverted uterus.

Cone the fingers of the other hand and apply the pressure over the insertion of one Fallopian tube.

Direct the force to one side of the sacral promontory.

Placenta adherent, replace all.

Placenta partially detached, separate and remove the placenta before replacing.

(b). Difficult Cases.

Taxis with the aid of the genu-pectoral position and Sims' speculum.

Elastic pressure by means of a water-bag, alternated with taxis.

Avoid extreme measures during the puerperium.

RUPTURE OF THE UTERUS.

Nature of the Accident.—Generally begins in the lower segment.

May be partial or complete, *i. e.*, it may extend to or into the peritoneum.

May take any direction and may reach any extent within the limits of the organ.

May invade the vagina and the bladder.

The portio vaginalis may be torn off.

Notable fissures of the cervix occur in nearly all labors.

Spontaneous rupture occurs rarely during pregnancy, most frequently at or soon after the close of the first stage of labor.

Frequency.—1: 4,000.

Causes.—(a). *Predisposing.* Anything which impairs the integrity of the uterine muscularis, carcinoma, myoma, etc. Obstructed labor, leading to excessive thinning of the lower uterine segment, is the chief predisposing cause.

(b). *Exciting.* Ergot, operative violence, such as forceps through undilated os, version during contraction, other operations.

Prognosis.—*Mother.* Mortality, ninety to ninety-five per cent., from hemorrhage, peritonitis, septicemia.

Child. Mortality still greater.

Diagnosis.—*Precursory Signs:*

Concurrence of obstruction with violent uterine effort;

Excessive uterine retraction—locate retraction ring by abdominal palpation.

Signs of Rupture:

Collapse:

Hemorrhage—external, sub-peritoneal, intra-peritoneal;

Local pain:

Sudden cessation of contractions, in complete rupture:

Sensation of tearing;

Recession of the presenting part:

Absence of the signs of foetal life;

Uterus and child present separate tumors.

Treatment.—(a). *Preventive.* Remove the cause of obstruction if possible; correct malpositions; puncture a hydrocephalic head, etc.

Artificial delivery in excessive retraction of the uterus, by forceps or by version, when practicable without violence.

(b). *Remedial.* Immediate extraction of the child, if it is still wholly or mainly in the uterus—by perforation in the grasp of the cephalotribe or forceps, if demanded in the interest of the mother, and especially if the child is dead, except as indicated below.

Drainage with iodoform-gauze, or iodoform wicking in incomplete rupture.

Laparotomy in complete rupture in case of child wholly in peritoneal cavity, child long dead, much hemorrhage into peritoneal cavity, cervix not dilatable, site of rupture unfavorable for drainage.

Treat the uterine lacerations by deep suture, or by peritoneal suture and gauze drainage, according to the condition of the wounds. Cleanse the peritoneum with the normal salt solution.

Amputation of the uterus if necessary to avert sepsis—especially advisable in extensive lacerations or septic uterus. Method as in Porro operation; or, stump may be treated in accordance with modern intra-peritoneal methods practised in amputations for other conditions.

Drainage, in favorable cases, after extraction, by the natural passages. Fold a large rubber tube, tie the limbs together, cut a large opening in the bight of the tube and pass the bight up through the uterine rent and about an inch beyond; or drain in similar manner with iodoform wicking or gauze. Keep the uterus contracted. Remove the drains in three to five days, on cessation of notable drainage.

THE HEMORRHAGES.

ANTE-PARTUM HEMORRHAGE.

I. PLACENTA PRÆVIA.

Definition.—Implantation of the placenta upon the lower zone of the uterine walls.

Cause of Hemorrhage. Separation of the lower margin of the placenta during canalization of the cervix.

Degrees of Placenta Prævia:

1. Marginal, edge presenting.
2. Partial, partially covering the fully dilated os uteri.
3. Complete, wholly covering the fully dilated os. Exact central implantation is rare.

Frequency.—1:1,000. More frequent in multiparæ than in primiparæ.

Causes: Morbid conditions of uterine mucosa and consequent tardy fixation of ovum;
Enlargement of the uterus;
Relaxation of the uterus.

Source of the Hemorrhage, the uterus; sometimes the placenta as well.

Prognosis.—*Mother.* Mortality, in cases that go to the latter months, one-fifth to one-fourth, including deaths from the sequelæ.

Child, two-thirds.

Mortality to both mother and child varies with the degree of placenta prævia.

The maternal mortality is due to hemorrhage, shock, sepsis and thrombotic affections;

The fœtal, to apnœa, hemorrhage, prematurity, operative causes.

There are practically no deaths from placenta prævia before the seventh month.

The danger increases as gestation progresses, since the vessels are larger and separation of the placenta is more liable to occur.

Diagnosis.—*Symptoms.* Usually none in the early months.

The first indication generally is a sudden hemorrhage of greater or less severity.

The first hemorrhage occurs most frequently in the seventh or eighth month, sometimes not till term. Hemorrhage of any note during pregnancy demands investigation, especially in the latter months.

Bleeding from placenta prævia during labor is most profuse in the intervals between the pains.

Physical Signs. (a). *Abdominal.* Placenta may sometimes be mapped out by abdominal palpation. Fœtal parts obscure under placenta, elsewhere more distinctly felt. Convex edge may sometimes be traced as a resisting ring.

(b). *Vaginal.*

Unusual development of the cervix, especially in complete placenta prævia;

A boggy feel of the cervix and the lower segment of the uterus;

A cushiony mass between the presenting part and the examining finger;

Characteristic stringy feel of the detached surface of the placenta, examined through the cervical canal: distinguish from clots by less friability.

In marginal placenta prævia the edge may be felt if separated.

Treatment.—1. *Before Viability.* In general, expectant.

If the hemorrhage be copious, placenta prævia complete, or the fetus dead, empty the uterus.

2. *After Viability.* Induction of labor, simple cases excepted.

Management of Labor. The principal indication is the control of hemorrhage. Hemorrhage controlled, wait, but remain with the patient till delivered.

Nature is competent in very rare cases by extra-rapid delivery.

Rupture of the membranes and the application of a firm binder may suffice in marginal and in certain cases of partial placenta prævia with but little hemorrhage. The presenting pole serves as a tampon.

Forceps, with very moderate traction, is permissible in similar conditions to hold the head in the lower uterine segment, as a tampon.

Tamponade should be mainly restricted to cases in which there is little or no dilatation of the cervix. Material may be the usual cotton pledgets, or gauze impregnated with zinc oxide and sterilized. Remove in six or eight hours. Renewal of the tamponade is rarely required. Barnes' bags in the cervix may be of service in similar cases for the double purpose of controlling hemorrhage and promoting dilatation.

Podalic version is an effectual measure for controlling the hemorrhage. It is especially indicated in case of much bleeding. With one or both feet down, the fœtus acts as a conical cervical plug. Bipolar version has the advantage that it may be done as soon as one or two fingers can be passed through the cervix. External version, when practicable, may be done earlier. In the bipolar method the edge of the placenta is pushed aside and fingers passed through the membranes. Even after sufficient dilatation it will rarely be necessary to pass the hand into the uterus.

After version extract very slowly and with extreme care to avoid shock, or leave expulsion to nature.

Other Methods. Separation of the placenta from the lower uterine segment (Barnes), permits retraction of the zone uncovered. The area of detachment should be not less than four and a half inches in diameter.

Complete separation and extraction of the placenta (Simpson)—applicable in case the child is dead or not yet viable.

Extraction of the child by perforation of the placenta—rarely permissible.

Precautions. Guard against shock, septic infection, post-partum hemorrhage. Give ergot for several days after labor.

Avoid too precipitate and violent interference. It is the cause of a large proportion of deaths in placenta prævia.

II. ACCIDENTAL HEMORRHAGE.

Hemorrhage from Partial Separation of a Normally Situated Placenta.

Varieties.—(a). *Apparent*.

(b). *Concealed*.

1. Separation central, margin adherent.
2. Separation at the margin partially lifting the membranes beyond the margin.
3. Separation the same as in 2, but blood escaping into the cavity of the ovum by rupture of the overlying membranes.
4. Separation of the margin of the placenta and of the membranes, but the lower segment of the uterus blocked by the foetal head.

Causes: The loose attachment of the placenta normal to the last weeks of gestation;
Violent muscular exertion;
Violent uterine contractions;
External violence;
Blood state, *e. g.*, of albuminuria, anæmia;
Placental disease.

Prognosis.—*Apparent Variety*. Not usually grave for the mother, frequently fatal to the child.

Concealed Variety. Maternal mortality, fifty per cent, from shock due to hyperdistention of the uterus or operative violence, from blood loss, post-partum hemorrhage, sequelæ.

Foetal, ninety per cent. or more.

Diagnosis.—*Apparent Variety*, obvious.

Concealed. The principal signs are:

Uterine distention;

A node or boss on the surface of the uterus at site of the blood collection;

Atony of the uterus;

Uterine tumor doughy;

Foetal parts obscured;

Continuous pain in certain cases from distention of the peritoneal coat of the uterus;

Signs of internal hemorrhage, *viz.*:

Collapse;

Pallor;

Surface cold, clammy, especially the extremities;

Perspiration ;

Respiration irregular, sighing, sobbing, yawning ;

Pulse rapid, thready, compressible ;

Thirst ;

Jactitation ;

Tinnitus aurium ;

Dyspnœa ;

Nausea ;

Dimness of vision ;

Syncope.

Bloody liquor amnii—push up the presenting part and allow a portion of the liquor amnii to escape in order to see if it is bloody ;

Fœtal heart tones feeble, irregular.

Concealed and slight apparent hemorrhage may co-exist.

Distinguish from rupture of the uterus which occurs later in labor and is attended with recession of the presenting part, with diminution of the uterine tumor and the development of a new abdominal tumor ; from placenta prævia by absence of the physical signs of misplaced placenta.

Treatment.—*In Either Variety.* Dilatation of cervix, manually.

Cervix dilated, rupture of the membranes.

Uterine compression by means of a binder, and the use of ergot hypodermically.

Artificial extraction after full dilatation by forceps, version, or by craniotomy in dead or non viable fœtus.

Be prepared for post-partum hemorrhage.

Treat the acute anæmia as in other cases.

Treatment of Acute Anæmia.—Elevate the hips and lower the head.

Bandage the extremities—auto-transfusion—temporarily.

Hot applications to the feet and warm ones to the head.

Opium in full doses, gr. ii., p. r. n., or its equivalent, to fill the cerebral vessels.

Hypodermic injections of brandy or ether, fluid extract of digitalis, m℥. to m℥v., strychniæ sulph. gr. $\frac{1}{30}$, trinitrin gr. $\frac{1}{100}$ to $\frac{1}{50}$ or $\frac{1}{25}$.

Injection of the normal salt solution (six-tenths of one per cent.—approximately, gr. iii. ad ℥i.), warm and sterilized, into the rectum, or hypodermically, between the scapulæ, Oj. to Oij., or into a vein in similar quantity.

An easily improvised apparatus for intravenous infusion may be made with a glass funnel, two feet of rubber tubing and a glass or metal canula. All should be sterilized by boiling.

For the thirst, a saline drink,—*e. g.*, a weak solution of ammon. acetat. Fluids by the stomach must be given in small quantities and often, beginning with $\frac{3}{4}$ i., at intervals of one or two minutes. Plain hot water, brandy or whiskey and water, are useful restoratives. Nutrient fluids may be given after a few hours.

POST-PARTUM HEMORRHAGE.

Rare in well managed labors.

The normal blood loss at the close of labor varies from two or three ounces to a pint.

Causes.—Failure of retraction due to

1. Inertia uteri, from previous over-distention of the uterus, exhaustion, mismanaged third stage, excess of chloroform, full bladder or rectum;
2. Neoplasms;
3. Blood state, as in hæmophilia, chronic nephritis.

Diagnosis.—*Danger Signals:*

History of hemorrhage in previous labors;

Pulse at or above 100;

Imperfect retraction;

Presence of other causes of hemorrhage.

Signs:

A sudden outburst of blood;

No uterine globe;

Systemic effects of severe hemorrhage. (See page 152.)

Absence of visible flooding does not forbid the diagnosis of hemorrhage.

A flow of blood with firm uterine contraction does not come from the uterine cavity. Examine for cervical or vaginal lacerations.

Treatment.—*Nature's Hemostatics:*

Retraction of the arteries;

Valve-like action of the veins, owing to their obliquity;

Thrombosis;

Ligation of the vessels by uterine retraction.

Prophylactic. Ligation of the uterine vessels by firm and persistent retraction. In order to this compel the uterus to expel the child; compel it to expel the placenta.

Keep the hand over the uterus till the third stage is completed.

Give ergot, hypodermically, in the presence of the recognized causes of hemorrhage, at beginning of third stage.

Keep rectum and bladder empty.

Remedial. (a). Simple Cases. Manipulation, by one or both hands over the abdomen;

Ergot (hypodermically), fluid extract, $\mathfrak{z}\text{i.}$ to $\mathfrak{z}\text{iss.}$;

Hot intra-uterine douche, at a temperature of 110° to 120° F.

(b). Severe Cases. Hand in uterus, raking the cavity vigorously with the finger tips;

Hot douche, temp. 115° to 125° F.;

Styptics (rarely), applied with a swab, such as tincture of iodine, spirits of turpentine, lactic acid, acetic acid (or common vinegar), creolin, chloroform, most of which act also to excite uterine contractions.

The most effective measure for the control of severe post-partum hemorrhage is the uterine tamponade with iodoform-gauze or simple sterilized gauze.

Method. Seize the cervix with a volsella and draw it well down. Push the gauze into the cavity of the uterus with a uterine dressing forceps or with the fingers. In the absence of instruments the gauze may be packed with the fingers alone.

Remove cautiously in twelve to twenty-four hours.

Watch the pulse, the respiration, the color of the face, lest the patient be dying in collapse while you are absorbed in the treatment of the hemorrhage.

Other Measures. Child to the breast as a reflex excito-motor:

Compression of the aorta, very effectual as a temporary expedient:

Flagellation of the lower part of the abdomen with a wet towel:

Faradism of the uterus: one pole within the uterus and one over the abdomen or upper sacral region: or, poles both over the abdomen, one on either side of the uterus:

Curette.

Hemorrhage from a torn cervix is best controlled by suture: the first stitch should be passed above the angle of the tear.

Vaginal hemorrhage may be managed by pressure, better by suture.

SECONDARY HEMORRHAGE.

Definition.—A hemorrhage occurring within the post-partum month later than six hours after labor.

Cause, frequently retention of membranes or placental fragments.

Late hemorrhage, after ten days, may be due to misplacement of the uterus, distention of the bladder or rectum, too early getting up, violent emotion.

Treatment.—Remove the causes.

Give hot vaginal douches, two or three gallons, temp. 115° to 120° F., morning and evening; this failing, curette the uterine cavity and pack lightly with iodoform-gauze: remove in three days.

SEPARATION OF THE SYMPHYSIS PUBIS.

May occur spontaneously from excessive relaxation of the pelvic joints at term: more frequently is the result of unskillful use of forceps. The vagina and bladder may be lacerated.

Diagnostic Signs.—Mobility of the ends of the pubic bones upon each other. Sulcus between the bones. Later, outward rotation of the femora, locomotion impeded.

Treatment.—Support by means of a firm pelvic bandage maintained for at least four weeks.

PATHOLOGY OF THE PUERPERIUM.

GALACTORRHŒA.

Excessive secretion of milk. Amount may reach several quarts daily. Quality thin and watery. May affect one or both breasts. Often results in severe, even dangerous impairment of the general health.

Treatment. Compression of the breasts by means of a binder. Restriction of fluids. Potass. iodid., gr. v., t. i. d. Tonics and general restorative measures.

MAMMARY ABSCESS.

Frequency.—Occurs in five to six per cent. of nursing women.

Causes.—*Predisposing:* Bad general health, lowering the resisting power;

Milk stasis, impairing the vitality of the epithelium of the lactiferous ducts;

Lesions of the nipples.

Exciting: Sepsis.

Forms.—*Subcutaneous;*

Glandular—parenchymatous mastitis; in the great majority of cases a lymphangitis.

Subglandular—paramastitis.

Two or all forms may co-exist.

Diagnosis.—*Subcutaneous Form.* Presents the signs of ordinary phlegmon; is generally single.

Glandular Form. Characterized by:

More pain;

More constitutional disturbance;

Generally ushered in by a chill;

Gland indurated.

Is often multiple.

Subglandular Form. Distinctive signs are:

Temperature persistently high ;

Pain deep-seated ;

Gland not indurated ;

Gland floats on the underlying fluid.

Pass an exploring needle beneath the gland.

Treatment.—1. *Prophylactic.* Massage in simple milk engorgement, without inflammation.

Limit the amount of fluids ingested.

Relieve hypersecretion, if necessary, by saline cathartics, or in non-nursing patients by topical use of atropiæ oleas.

Tonics, especially quinine.

Aseptic management and curative treatment of nipple lesions.

Support of engorged breasts with a sling.

The Richardson or Murphy binder.*

2. *Abortive.* Absolute rest of the gland in severe mastitis.

Abstinence from fluids.

A saline cathartic.

Oleate of atropia, locally, with care lest the milk secretion be too much repressed.

Quininæ sulph., gr. v. bis die.

3. *Treatment of Suppuration.* Open early and freely, with antiseptic precautions. Incision should radiate in a direction from the nipple, avoiding the areola.

Insert drainage-tube.

Counter-opening if necessary for drainage.

Prolonged antiseptic irrigation repeated p. r. n. Peroxide of hydrogen is a good antiseptic for the purpose.

Antiseptic dressings.

Compression to keep the walls of the abscess cavity in contact.

TREATMENT OF SORE NIPPLES.

Cleanse after each nursing with a saturated aqueous solution of salicylic or boric acid. Dry and pencil with fresh white of egg, or saturate with cocoa butter.

The following nipple lotion is useful in excoriation: \mathcal{R} Plumbi nitrat. gr. x., Glycerin. \mathfrak{z} ii., Aq. ad. \mathfrak{z} i.

*The Murphy bandage is made of one piece of muslin with arm holes and with a V shaped neck hole in front.

A good, soothing and antiseptic dressing is the following: \mathcal{R} Amyl. glycerit., Bismuth. subnit., āā ʒss . Does not need to be removed before nursing. Cleanse with the salicylic solution after nursing and reapply the bismuth mixture.

These measures failing, rest one nipple for twenty-four hours, or let the child nurse through a nipple shield.

For relief of pain in nursing, pencil five minutes before nursing with a one per cent. solution of cocaine which has been sterilized by boiling.

Fissures may be dusted with powdered tannin, or lightly touched once daily with the solid stick of nitrate of silver, first penciling with the cocaine solution, or the fissures may be painted with the compound tincture of benzoin several times daily.

PUERPERAL ECLAMPSIA.

Definition.—Eclampsia during pregnancy, parturition, or the puerperal period, from causes pertaining to the gravid, the parturient or the puerperal condition.

Frequency.—1 : 500 cases of advanced pregnancy ; 1 : 4 of all cases of pregnancy nephritis.

Most frequent in primiparity, twins, excess of fat.

Occurs more frequently in pregnancy or labor than in the puerperal period.

Causes.—Peripheral irritation, especially reflex irritation from the uterus.

Uræmia the chief cause, the toxic material acting upon the convulsive and the vaso-motor centers.

The uræmia is due to acute renal insufficiency, acute parenchymatous or, in a certain proportion of cases, chronic nephritis, or to acute supervening upon chronic.

The cause of pregnancy nephritis is believed by Tyson to be the irritating effect of a toxic substance in the maternal blood, which is contributed by both mother and fœtus.

The convulsive seizures have been attributed to acute anæmia of the brain from vaso-motor spasm of the cerebral vessels.

Premontory Symptoms and Signs :

Albuminuria ;

Tube casts in the urine :

Œdema, especially of the face ;

Debility ;
 Headache, generally frontal, suboccipital rarely ;
 Nausea or other digestive disorders ;
 Contracted pupil ;
 Visual disturbances ;
 Epigastric pain.

Differential Diagnosis.—Distinguish from hysterical and epileptic convulsions.

Clinical Phenomena.—The symptoms already referred to :

Eyes fixed ;
 Spasmodic movements, first of the facial muscles, then becoming general ;
 Convulsion at first clonic then tonic ;
 Asphyxia and cyanosis from tonic spasm of the respiratory muscles ;
 Frothing at the mouth, generally bloody ;
 Duration, one or two minutes ;
 Coma follows, usually subsiding within half an hour ; intervals, from a few minutes to several hours ;
 Pulse, 100 to 140 ;
 Temperature varies in different cases from normal or subnormal to 105° F., or more.

Prognosis.—Graver the earlier the attack in pregnancy or labor.

The danger increases with the number of seizures.

Recovery is rare after fifteen or twenty convulsions ; seldom occurs after a temperature of 105° F.

Impairment of the mental faculties sometimes remains.

The nephritis of pregnancy in women pregnant for the first time after forty years of age is uniformly fatal if the pregnancy is allowed to go to the latter months. (Tyson.)

Pregnancy in primiparæ having nephritis before conception is invariably fatal if not interrupted before term. (Tyson.)

Mortality. Maternal, about thirty per cent., from slow asphyxia during convulsion, cerebral hemorrhage, or congestion from exhaustion.

Fœtal about fifty per cent., from asphyxia, apoplexy or lesions of the cord or from high temperature.

Treatment.—*Prophylactic.* Treatment of the nephritis. Milk diet. Nephritic gravidæ put on a milk diet sufficiently early, invariably escape convulsions. (Budin.)

Tonics.

Saline cathartics.

Diaphoresis. Daily hot baths and packs and spirits of nitrous ether in large doses.

Digitalis and saline diuretics.

Dry cups over the kidneys.

Bromides or chloral, if required, as prophylactics against convulsions.

Ext. veratri viridis fl. (Squibb), m iii. to m vi. , t. i. d., or enough to keep the pulse below 70, for the same purpose.

Iron as a restorative.

Induction of labor in cases that do not yield promptly.

Acceleration of the labor, cautiously. The danger is practically over in two-thirds the cases after delivery.

Chloroform during labor, as an anti-eclamptic. Its use is imperative during operative interference.

Remedial. Chloroform, by inhalation.

Ext. veratri viridis fl. (Squibb), m x. to m xx. , hypodermically; repeat in a half hour if the pulse is not below 60 to the minute. A convulsion is practically impossible while the patient is sufficiently under the influence of veratrum to hold the pulse-rate below 60. The patient must not be permitted to assume the upright posture while fully under the influence of veratrum. Collapse under veratrum is readily combatted by the use of morphia, hypodermically, or by whiskey given in the same manner or by the rectum.

Catharsis, by calomel and salines: elaterium (Merck), gr. $\frac{1}{4}$: or ol. tigllii, m i. or ii.

Other Measures. Wet cups over the kidneys.

Chloral 3ss to 3i, in a half cup of milk, per rectum. Repeat, if necessary, t. i. d. No remedy has a better record in eclampsia than chloral.

Morph. sulph., gr. ss. to gr. iss., hypodermically.

Nitroglycerine, gr. $\frac{1}{50}$.

Nitrite of amyl, m v. , by inhalation.

Inhalation of oxygen.

Accelerate the labor. Induce labor if not spontaneously established.

Restorative. Iron and general tonics.

CARDIAC DISEASE.

Advanced cardiac lesions are a dangerous complication of labor.

The dangers are, engorgement of right heart, œdema of the lungs. The danger is greatest at close of labor.

Treatment Before and During Labor.—Tr. strophanthi, \mathfrak{m} v., q. v. h., ext. digitalis fl., \mathfrak{m} i., guarded with trinitrin, gr. $\frac{1}{100}$, t. i. d., strychniæ sulphat., gr. $\frac{1}{40}$, t. i. d.

Anæsthetic, ether, during the severe pains of labor.

Venesection in extreme engorgement of the right heart.

PUERPERAL INSANITY: INSANITY OF PREGNANCY, THE PUERPERIUM OR LACTATION.

May begin during pregnancy or the puerperium.

In the puerperium the onset occurs most frequently at the end of about two weeks, less frequently after five or six weeks.

Frequency.—About 1:400.

Causes: Hereditary predisposition;
Bad mental hygiene;
Anæmia.

Distinguish from the transient delirium of septicæmia.

Prognosis.—Generally favorable. Nearly seventy per cent. recover.

Treatment.—Mental and physical hygiene.

Suspend nursing.

Iron, pil. Blaud, one or two, t. i. d., or arseniate of iron, gr. $\frac{1}{10}$, t. i. d., in anæmia.

Chloral or the bromides, to procure sleep.

Sulphonal, gr. xx., as a hypnotic.

Hyoscyamine in maniacal forms, gr. $\frac{1}{200}$: repeat cautiously, if at all.

Morphia, cautiously, in melancholia.

Treat infection as in other cases.

PUERPERAL FEVER: PUERPERAL SEPTICEMIA.

Frequency.—In well managed, isolated maternities, less than half of one per cent. of puerperal women die from sepsis.

In pre-antiseptic times the average mortality in maternities was two to three per cent., and "epidemics" were frequent with a death rate of three to ten per cent., or even more.

In general private practice, without antiseptics, there is little less than one per cent. of fatal cases ; with aseptic management, there are practically no deaths from puerperal fever.

Puerperal fever occurs more frequently in primiparæ than in multiparæ.

Etiology.—*Cause*, septic infection. Lowered resisting power favors.

Sources of Infection. Lochia of puerperal fever patients ;

Secretions from suppurating or erysipelalous wounds ;

Idiopathic erysipelas ;

Diphtheria or scarlet-fever in certain cases, owing to complications involving the presence of wound infection germs ;

Cadaveric and other dead and decomposing animal matter ;

Self-infection (auto-infection) in the strict sense of the term does not exist.

Vehicles of Infection. The hands of the physician or nurse, instruments, utensils, cloths, germ-laden dust, etc.

Avenues of Absorption. The obstetric wounds of the lower uterine segment, the placental site, in fact the entire cavity of the uterus. Systemic infection springs most frequently from the uterine cavity.

Lacerations of the cervix, vagina, introitus.

Even intact surfaces of the genital mucosa.

Channels of Diffusion. The lymphatics and to some extent the veins.

Bacteriology. The organisms most frequently found are the streptococci—chain cocci : staphylococci are occasionally found.

The rod-shaped bacteria of putrefaction are generally present. Putrefaction of lochia furnishes a favorable soil for the development of pathogenic organisms.

Certain other microorganisms are believed to be possible factors in the pathology.

The putrefactive bacteria act solely, others largely by their chemical products—ptomaines.

Possible Lesions :

Endometritis ;

Salpingitis ;

Ovaritis ;

Metritis ;

Parametritis ;

Perimetritis or pelvic peritonitis;

Diffuse peritonitis;

Uterine lymphangitis and phlegmonous lymphadenitis—generally attended with peritonitis.

Phlebitis—uterine, para-uterine and crural.

Colpitis;

Pure septicæmia—acute ptomaine poisoning—putrid intoxication;

Other remote lesions, *e. g.*, pneumonia, pleurisy, pericarditis, endocarditis, nephritis, arthritis, subcutaneous phlegmons and others.

Prognosis.—As a rule, the earlier the attack the graver the prognosis.

Most unfavorable in acute putrid intoxication, diffuse purulent peritonitis, pyæmia.

Diagnosis.—*General Symptoms of Infection.* First symptoms generally developed on the second or third day, rarely later than the fourth or fifth, since the obstetric wounds have by that time begun to granulate.

The majority of cases begin insidiously.

The attack is frequently ushered in by a chill or slight chilliness.

The most prominent early symptoms are a rise of the pulse (100 to 140), elevation of temperature (102° to 104° F.), fetid lochia—yet sepsis is possible without fetor.

Eliminate malarial pyrexia (by quinine), fecal retention, emotional, mammary and other non-septic causes.

Symptoms of Special Lesions. Endometritis:

Painful and prolonged after-pains;

Cervix more patulous than normal for the time;

Cavum uteri containing putrilage;

Prolonged bloody flow;

Involution retarded.

Metritis: The same conditions as in simple endometric inflammation, together with œdematous swelling of the uterus.

Parametritis:

Localized pain and tenderness;

Exudate in one, possibly both broad ligaments;

Uterus displaced and partially fixed;

Fluctuation if pus forms—abscess forms in twenty per cent. of cases of parametritis.

Perimetritis:

Pain and local tenderness usually intense ;
 Uterus becomes fixed ;
 Tumefaction in vaginal vault ;
 Moderate tympanites ;
 Frequently nausea ;
 Lochia scanty.

Diffuse Peritonitis:

Exquisite pain in the early stages, usually ;
 Tympanites extreme ;
 Vomiting of greenish fluid ;
 Later, collapse.

Fatal cases terminate usually in four to five days.

Vulvar Lymphangitis:

Local tenderness and swelling ;
 Swelling of superficial inguinal glands ;
 Red streaks in the skin, leading from the vulva to the groin.

Uterine Lymphangitis:

Pain, tenderness and swelling of the uterus, frequently associated with signs of peritonitis.

Uterine Phlebitis:

Irregularly recurring chills ;
 Marked oscillations of temperature ;
 Absence of local tenderness and swelling in pure phlebitis ;
 Metastatic affections of remote organs, kidneys, liver, spleen, lungs, brain.

Phlegmasia Alba Dolens:

Thrombo-Phlebitic Form: Characterized by primary venous thrombosis, periphlebitis, and phlegmonous disease following in consequence of the infection and breaking down of thrombi ;

Develops several days or even weeks after delivery ;
 Is generally preceded by signs of pelvic inflammation or some form of sepsis ;
 Fever, first of a remittent then of an intermittent type ;
 Pain in the affected limb ;
 Limb becomes swollen, tense, hard, white, glistening ;

Affected veins felt on palpation as hard irregular cords,
 owing to thrombi;
 Resolution begins after about two weeks;
 Duration may be many weeks;
 Abscess formation or gangrene very rarely supervenes;
 There remains more or less œdema in standing or walking,
 with impairment of muscular power, in a certain proportion of cases lasting for months;
 Recurring chills are a signal of metastatic affections;
 The disease may extend from one limb to the other.

Cellulitic Form: Characterized by inflammation, suppuration and necrosis of connective tissue without venous thrombosis, and by lymphangitis, septicæmia.

Colpitis:

Signs of inflammation, simple catarrhal, ulcerative, diphtheritic;
 Labia often œdematous in ulcerative vaginitis.

Pure Septicæmia:

Characterized by pyrexia with absence of perceptible lesions;
 Countenance sallow, sunken, anxious;
 Occasionally delirium or coma;
 Diarrhœa, and vomiting of dark grumous ejecta;
 Runs a rapid course, frequently terminating within a few days.

In most cases of puerperal fever several of the lesions above described co-exist.

Treatment.—*Prophylactic.* Prevent infection by careful disinfection of the hands, instruments, utensils, etc., before each contact with the genitals.

Cleanse, antiseptically, the external genitals, lower abdomen and inner surfaces of the thighs before examination.

Disinfect the vagina and cervix before labor, for cause.

Examine, per vaginam, during labor, as seldom as possible.

In most cases vaginal examination may, when special care is required, be omitted altogether.

Avoid all preventable injury to the passages.

The mortality from puerperal infection in private practice with the proper use of antisepsis will not reach 2 in 1,000.

Remedial. General Treatment of Infection.

Catharsis, hydrarg. chlorid. mit., gr. x. to gr. xx., and a saline. This treatment applies especially to the first few days of the fever.

Dislodge the enemy and reinforce the resisting powers of the patient.

Vaginal douche, 1-1000 hydronaphthol, or 1-2000 bichloride or biniodide of mercury. A safe and most efficient germicide for the purpose is the peroxide of hydrogen in full or half strength.

Wash out the mercurial solution with a final injection of plain boiled water.

If the pyrexia is not relieved within twelve hours douche the uterine cavity with one of the non-mercurial antiseptic solutions.

This failing, the uterine cavity being septic, immediately remove all necrotic material with a large, dull curette and antiseptic douche. Drain the cavity by means of a strip of iodoform-gauze folded to an inch in width and pushed gently into the uterus.

In systemic infection support the patient with tonics—iron, quinine, strychnia,—stimulants (maximum dose nearly one quart of brandy or its equivalent daily), and forced alimentation. Reduce the temperature by cold sponging, cold packs, or the use of the cold coil.

Evacuate pus whenever found.

Treatment of Peritonitis.—Hydragogue cathartics with large stimulating enemata, to procure several copious evacuations daily; to be continued, p. r. n.

Moderate doses of opium if required to control pain.

Local antiseptic measures if indicated.

Dietetic supports, tonics and stimulants.

In localized purulent peritonitis, open the abdomen, irrigate and drain the pus cavity.

Treatment of Parametritis.—Hot vaginal douches, several gallons, temp. 110° to 120° F., two or three times daily.

Antiseptic and general treatment as above indicated.

In pelvic abscess, evacuate early and drain, by the vagina or the abdomen, as the indications in the case may require.

Treatment of Colpitis.—Irrigate several times daily with two and a half per cent. solution of creolin, chlorinated soda one in ten, or peroxide of hydrogen.

Touch necrotic patches with liq. ferri perchlorid., tr. iodine, or with a fifty per cent. sol. zinc. chlorid.

Treatment of Phlegmasia Alba Dolens.—Keep the limb at rest in a horizontal position.

Subdue pain by the local application of morphiæ oleas.

Avoid massage during the active stage of the disease ; it may cause embolism.

The patient may leave the bed when the swelling subsides and fever has long since ceased.

From that time should use support by means of an elastic (flannel) bandage or elastic stocking.

The cellulitic form should be treated by early and free incisions of the diseased structures.

SUDDEN DEATH IN CHILDBED.

The more important causes of sudden death in childbed are, shock, syncope, embolism and thrombosis, air embolism, acute pulmonary œdema, apoplexy, advanced cardiac lesions.

APPENDIX.

FORM FOR CASE RECORD.

Case of
No. Date of application 18

I. HISTORY.

Name Residence Age years
Nativity Married years para.
Character of previous pregnancies labors
 puerperiums
Miscarriages
Last menses from to Quickened
Health during present pregnancy

II. PRELIMINARY EXAMINATION.

(A month before labor.)

GENERAL CONDITION.

MAMMARY GLANDS, development

Nipples, healthy well developed or not

ABDOMINAL EXAMINATION.

Uterus, shape height of fundus

Liquor amnii, excessive or not

Location of placenta

Complicating tumors

Fœtus, one, two

Fœtal dorsum to mother's front, back, right, left.

Fœtal head, location		size
Fœtal heart-tones, location	rate	rhythm
Length of fœtal ovoid		

VAGINAL EXAMINATION.

Pudendum

Vagina

Cervix, old injuries	size	consistence
----------------------	------	-------------

Fœtus, presentation	position	posture
---------------------	----------	---------

PELVIC MEASUREMENTS.

Inter-cristal	Inter-spinal
---------------	--------------

External conjugate	Diagonal conjugate
--------------------	--------------------

True conjugate	Other measurements
----------------	--------------------

URINE.

Daily amount	Reaction
--------------	----------

Specific gravity	Albumin
------------------	---------

Sugar	Casts
-------	-------

Other microscopic findings

SUBSEQUENT OBSERVATIONS.

III. LABOR.

First Stage.

PAINS began	frequency	character
-------------	-----------	-----------

GENERAL CONDITION.

pulse	temperature
-------	-------------

ABDOMINAL EXAMINATION.—Items as in II.

Also :

Abdomen pendulous	Bladder full or empty
-------------------	-----------------------

VAGINAL EXAMINATION.—Items as in II.

Also :

Rectum full or empty	vaginal secretions
Os internum effaced	
Os externum, size	consistence of margin
thickness of margin	
Membranes ruptured or not	
Bag of waters, shape	size
Presentation	position

COMPLICATIONS.

TREATMENT.

DURATION.

Second Stage.

GENERAL CONDITION.

pulse	temperature
-------	-------------

CHARACTER OF PAINS.

VAGINAL SECRETIONS.

MEMBRANES ruptured when	how
-------------------------	-----

CAPUT SUCCEDANEUM, size

MECHANISM.

PERINEAL STAGE, duration	management
--------------------------	------------

COMPLICATIONS.

MANAGEMENT, medication

operative interference

TERMINATED at

DURATION.

Third Stage.

UTERINE CONTRACTIONS.

PLACENTAL DELIVERY at method

COMPLICATIONS.

PLACENTA.

Length

Width

Weight

Anomalies

Also:

UMBILICAL CORD, insertion

length

anomalies

MEMBRANES, complete or not how removed

UTERUS, retraction height of fundus shape

INJURIES.

Uterus

Cervix

Vagina

Pudendum

Treatment

GENERAL CONDITION.

pulse

temperature

TREATMENT.

DURATION of placental stage

Subsequent Daily Record.

GENERAL CONDITION.

pulse

temperature

DIET.

BREASTS AND NIPPLES.

BOWELS.

BLADDER. (Examine over abdomen for over-distention.)

UTERUS, height of fundus width

consistence sensitiveness

(In third or fourth week examine bimanually.)

LOCHIA, amount	character
----------------	-----------

color	odor
-------	------

OTHER OBSERVATIONS.

TREATMENT.

Condition on Dismissal.

18 .

GENERAL CONDITION.

BREASTS.

UTERUS, size shape position

Cervix, size	shape	position
--------------	-------	----------

injuries cervical canal, how large

VAGINA.

PUDENDUM.

OTHER PELVIC STRUCTURES.

IV. CHILD.

Observations at Birth.

SEX.

GENERAL CONDITION. respiration

circulation pulse

temperature in rectum

rectum and urethra pervious

DEVELOPMENT.

	length	weight	nutrition				
Head	Diameters		O. M.	O. F.	S. O. B.	BI-P.	BI-T.
	Circumferences						

Other measurements

CAPUT SUCCEDANEUM, size location

SKIN, vernix caseosa lanugo

INJURIES.

CONGENITAL ANOMALIES.

Subsequent Daily Record.

GENERAL CONDITION.

EYES.

MOUTH.

SKIN.

DIGESTION.

UMBILICAL WOUND.

NUTRITION, breast bottle

well nourished or not

weekly gain in weight

OTHER OBSERVATIONS.

TREATMENT.

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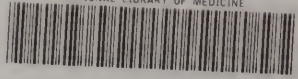
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